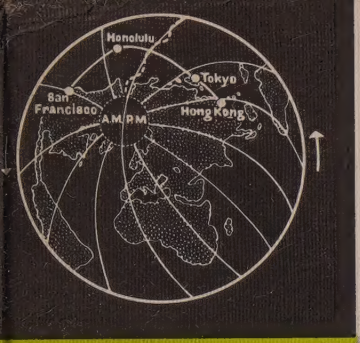

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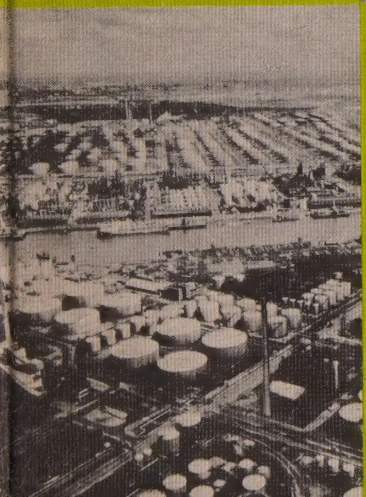

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PREFACE

THIS book is the fourth in a series of five books prepared for use in secondary schools. It deals with the regional geography of Europe, including some detailed studies of Ordnance Survey maps, and introduces aspects of physical, economic and mathematical geography.

The book follows the pattern of Books I, II and III in this series. Ordnance Survey maps, sketch maps, diagrams, pictures, descriptions and other forms of geographical data have been included to provide material which the pupils have to study in order to answer the questions included in the text. Two important points arise from this method of approach.

The first is that the exercises have been made to vary considerably from the simple to the very difficult. Such a variation of difficulty is, of course, essential both from the point of view of the diversity of the data supplied and of the wide range of experience and ability of the pupils who may use this book. Each teacher must, therefore, decide which questions can be answered as individual written exercises at home or in school, and which, because of their greater degree of difficulty, need further explanation in class.

The second point concerns the follow-up of the exercises. In oral teaching, one question leads to another and on to a variety of new topics, but it is impossible to cater completely for this in a book. It is hoped, however, that the maps, pictures and other data will enable teachers to develop class discussion, where necessary, beyond the topics included in the exercises.

In accordance with current meteorological practice, temperatures are quoted in degrees centigrade (celsius). Rainfall figures are given in inches as this unit is still used for rainfall measurement in English-speaking countries.

This series of books has been carefully graded and several references have been made in the text to Books I, II and III.

This does not assume that the pupils will have copies of these books, but it may well be helpful if one copy of each is available for reference by either teacher or pupils.

Every teacher has his own ideas on selection and planning. Although the work in this book follows a carefully planned progression, there is no necessity to follow this exact order all the way through or to complete every exercise. Indeed, abundant material has been offered in order to give teachers the opportunity of selecting the work most suited to their own classes.

Finally the author wishes to thank the many people (pupils, students, teachers and colleagues) who, directly or indirectly, have helped in the preparation of this book. In particular, D. Symes (Raday), J. W. Wagstaff (Ythion), Dr A. H. Kampp (Gronvang), Professor W. R. Mead (diagram for Finland), Dr N. J. Graves (M. Perret's holding), J. C. Creigh (Nicksic polje), R. M. Highsmith (hacienda in Spain), Götaverken Shipbuilding Co. (Sweden), Stora Kopparberg (Sweden), Shell International (Borgo a Morzanno and North Portugal), European Community Information Service (Chapter IV), Information and Tourist Offices of all the countries in Europe.

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CHAPTER I

INTRODUCTION—CONTRASTS IN EUROPE

If we look at Europe on a map of the world, it appears as a peninsula of the great land mass of Asia. The following figures show its relative importance in the world:

Continent	*Area in thousands of square miles*	*Population in millions*
Asia (excluding U.S.S.R.)	10,661	1,867·0
America	16,241	468·0
Africa	11,683	318·0
Europe (excluding U.S.S.R.)	1,903	449·0
Australasia	3,286	17·8
U.S.S.R.	8,649	233·0
Total	52,423	3,352·8

In the past, Russia west of the Urals was considered as part of Europe while the territory to the east was in Asia. In the nineteenth century, Russia colonised much of Siberia and Central Asia and since the revolution of 1917, the whole vast area has been developed as the Union of the Soviet Socialist Republics (U.S.S.R.). The old boundary of Europe and Asia is thus no longer realistic. The whole of Russia was studied in Book 3 of this series, so that this book is concerned with Europe west of the U.S.S.R.

A striking characteristic of Europe is its very long coastline, which means that the sea has always influenced the way of life of the people. As Sir Halford Mackinder put it:

> The fiords of Norway, the Baltic Gulfs, the great series of navigable rivers from the Neva to the Tagus and all the intricacies of the Mediterranean . . . gave inevitably a maritime aspect to European civilization.[1]

[1] *Britain and the British Seas*, London 1902.

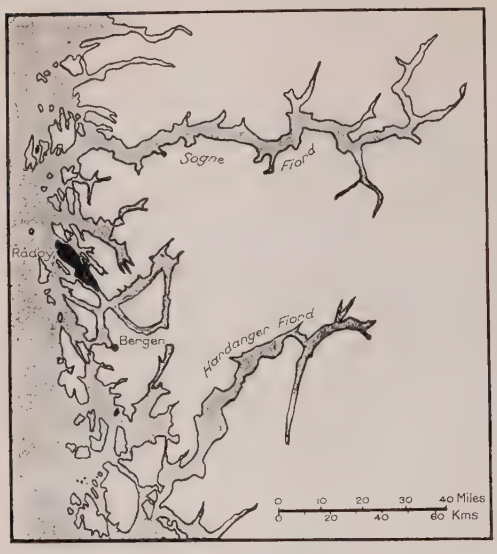


FIG. 1. PART OF THE COAST OF WEST NORWAY SHOWING RADOY.

1. How does Europe rank (*a*) in area (*b*) in population with other continents?
2. From your atlas find:
   (*a*) The latitude of the most northerly and southerly parts of Europe.
   (*b*) The difference between them (the latitudinal extent).
   (*c*) The difference in longitude between W. Ireland and the Russian frontier (the longitudinal extent).
3. Name the seas which surround Europe.
4. Europe has been called 'a peninsula of peninsulas'.
   (*a*) What does this mean?
   (*b*) Name some of the peninsulas.

Fig. 1 shows the position of the island of Radoy (population 4,000), one of the thousands of islands known as the *skerryguard* off the coast of Norway. Fig. 2 was taken with the camera pointing west across the main settlement, Manger, towards a neighbouring island. The relatively level land along the shoreline is known as *strandflat*. Above the 100 foot contour the land rises steeply to hills of ancient crystalline rocks which have been stripped bare of soil and moulded by the passage of ice. Fig. 3 shows the whole island. Though much of the northern part of the island is strandflat, 70 per cent. of the whole island is unproductive, for

FIG. 2. AERIAL VIEW OF RADOY.

much of the strandflat consists of lakes and peat bog. An annual rainfall of over 80 inches makes drainage difficult.

In the past when communication with the mainland was by boat only, the people of Radoy were almost self-supporting, farmers in summer and fishermen in winter. Today the island is connected by a main road and ferry to the town of Bergen 25 miles away. As a result, the 600 small farmers of Radoy concentrate on the production of milk for the town. In the foreground of Fig. 2 some farmland can be seen with grass for hay as the chief crop. The three dark lines indicate the hay-drying racks which are a characteristic feature of Norwegian farms. There is no sign of cattle grazing in the fields as in Britain, for the land is too precious and the animals are stall-fed in large barns such as that

FIG. 3. RADOY.

FIG. 4. A FARM ON RADOY.

to the left of the dwelling house in Fig. 4. All the small settlements shown on the map have creameries to which the milk is sent to be prepared for despatch to Bergen. About one quarter of the output is made into cheese, mainly at the creamery at Manger.

Because farms are small, about half of the farmers need to take another job and many join the winter fishing fleets or work at the small canneries shown on the map. The sea is an important source of wealth for the Norwegians for huge shoals of herring and cod come in-shore to spawn from January to March. Vessels with echo-sounding devices find the shoals and inform by radio-telephone the fishing boats waiting in Norway's west coast ports, chief of which is Bergen. Herring are caught off South Norway in nets cast from large drifters with a crew of ten, or seiners with a crew of twenty. The glut of fish in a short season means that most of the catch has to be processed in canneries and oil factories. There are also fish-meal factories which produce fertiliser. The main spawning ground for cod is West Fiord between the Lofoten Islands and the mainland. At the height of the season as many

FIG. 5. FISHING BOATS AT HENNIGSUAER (LOFOTEN ISLANDS) IN WINTER.

as 4,000 motor fishing boats crowd into the area and the Lofotens have a temporary tenfold increase in population (Fig. 5). The boats are small, the line fishing boats having a crew of two or three and the netters up to six. The traditional method of processing cod is to dry and salt it, drying racks being an important part of the Lofoten Islands scene. Today freezing plants are increasing in importance and there are large new works at Hammerfest and Trondheim on the mainland. Norway also has a fleet of about 100 whalers and eight factory ships which are based at Sandefiord at the south-west entrance to Oslo fiord. They spend from October to May in the Antarctic.

5. (*a*) Draw a labelled sketch to show the main features in Fig. 2.
   (*b*) Write brief notes under the headings: (i) physical features; (ii) land use; (iii) settlement.
6. Study Fig. 4 and write a brief description.
7. (*a*) From Fig. 3 estimate the area of Radoy.
   (*b*) Calculate the density of population.

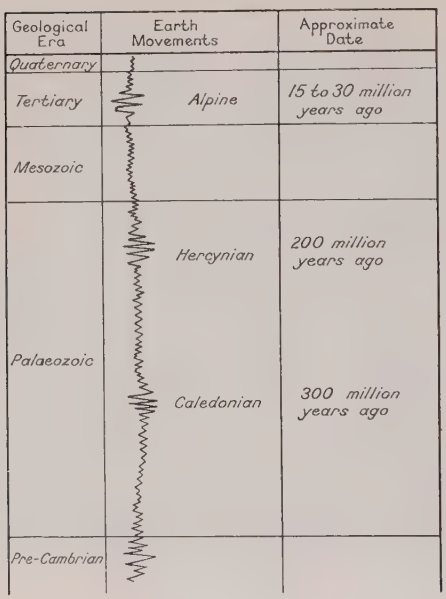


FIG. 6. GEOLOGICAL TIME SCALE.

8. (*a*) Give two reasons why fishing is an important occupation in West Norway.
(*b*) Describe the scene in Fig. 5.
(*c*) In what ways is the fishing industry being modernised?
(*d*) What are the main differences between cod and herring fishing?
(*e*) (i) Only one-third of the cod fishermen are full-time fishermen. Why? (ii) What other occupations can they follow?

Radoy is typical of the strandflat of the west coast of Norway. On the mainland, the mountains rise steeply to a height of over 6,000 feet trending from north-east to south-west. They are part of the Great Caledonian mountain range which was folded in Palæozoic times (Fig. 6). It was reduced by forces of erosion such as rain, wind and ice but it was later uplifted to form high plateau country. The snow and ice fields of the highest parts of the plateau today are the shrunken remnants of the Great Ice Sheet which extended over much of Europe in Quaternary times (Fig. 6). You will learn more about this in Chapter II. When the climate grew warmer, the ice retreated slowly and its melt water caused the sea level to rise throughout North-West Europe.

This led to widespread submergence along the coasts, the lower parts of the river valleys being drowned to form inlets.

In Norway, the valleys which had been deepened by ice to form steep-sided glacial troughs became *fiords* and the skerryguard was detached from the mainland. The fiords provide numerous sheltered harbours while the skerryguard protects the shipping channels from storms. Over 3,000 light-ships and buoys mark the shipping lanes. Since the period of submergence, there has been a gradual rise of the land which had been depressed by the weight of the ice, thus producing the strandflat.

9. From your atlas find:
   (*a*) The highest part of the Norwegian plateau and note its height and name.
   (*b*) The names and approximate lengths of the two longest fiords, north and south of Bergen (see Fig. 1).
   (*c*) (i) To which country does the Caledonian mountain range extend if the trend is followed to the south-west?
   (ii) Suggest how the range got its name.
10. Name three other countries where fiords are found.

Fig. 7 shows a typical weather situation in winter.

11. (*a*) Draw five columns headed, temperature, wind direction, wind speed, cloud amount, weather.
    (*b*) For each of the five weather stations along the coast of Norway fill in the details from north to south.
    (*c*) Compare the temperatures of Norway with those of places farther east.
    (*d*) From what you have discovered, describe the type of *air stream* which is affecting the coast of Norway.

This kind of air stream is associated with depressions or areas of low pressure which come across the Atlantic Ocean from west to east at regular intervals throughout the year. There is also a movement of warmer waters from the Gulf of Mexico which helps to raise the winter temperatures of North-West Europe. This ocean current is known as the *Gulf Stream* or the *North Atlantic Drift*. When the mild, moist air reaches the mountains of Norway it is forced to rise steeply, rapid cooling takes place and the moisture condenses to produce heavy *relief rainfall*. This type of climate is known as a *Maritime* or *Oceanic Climate*.

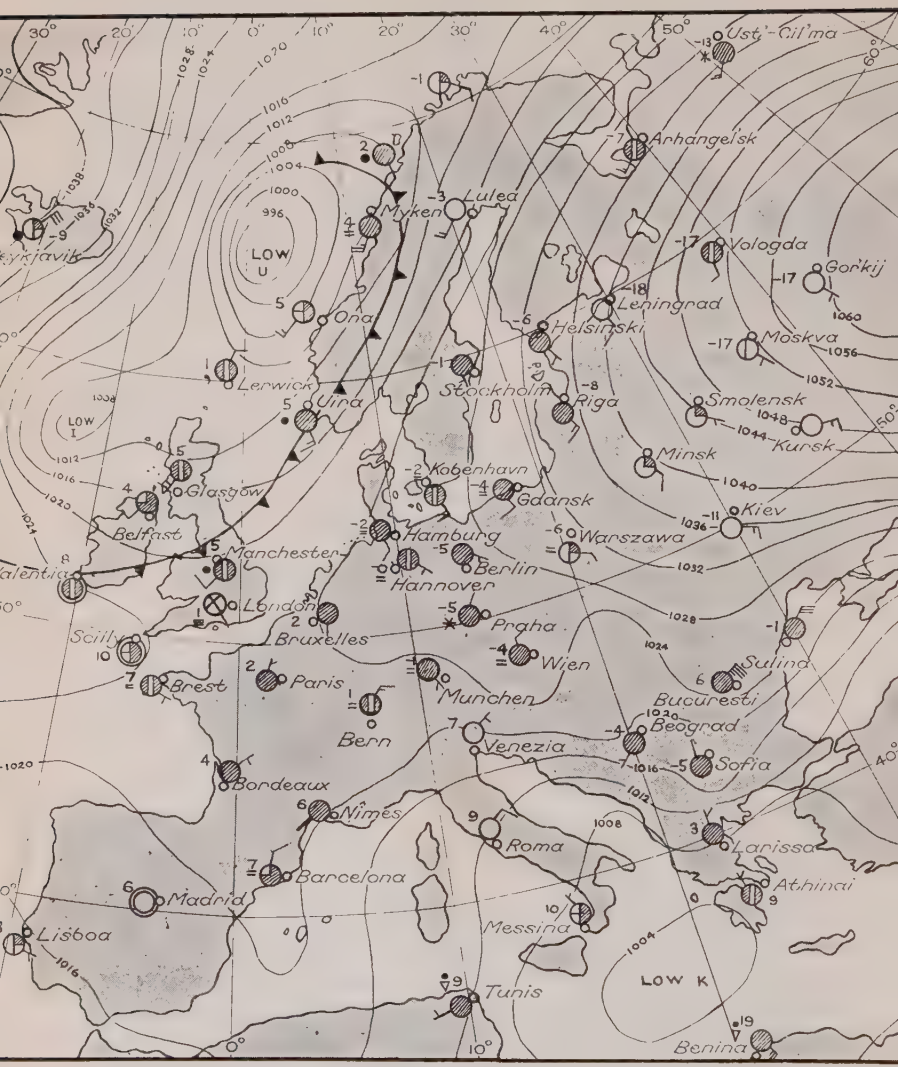


FIG. 7. DAILY WEATHER REPORT.

12. Study Fig. 9
   (*a*) Account for the heavy rainfall all the year round.
   (*b*) Draw a diagram to illustrate the cause of relief rainfall.

(*c*) What are the highest and lowest temperatures?
(*d*) What is the difference between them (range of temperature)?
(*e*) Using the graph and the information in the chapter, describe the characteristics of a Maritime Climate.

13. (*a*) Compare the temperature of Norway with that of the Black Sea Coast shown in Fig. 7.
(*b*) From your atlas, draw a sketch to show the course of the 0°C isotherm in winter.
(*c*) Can you account for this?

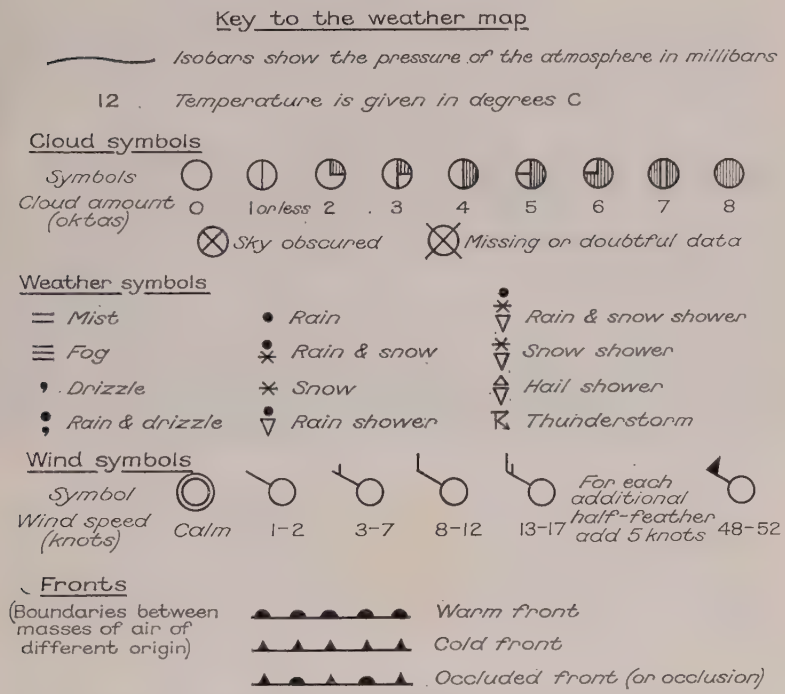


FIG. 8. KEY TO DAILY WEATHER REPORT 12 HOURS G.M.T. 4TH JANUARY, 1969.

The Norwegians have long been seafarers, driven by the poverty of their land to seek territories overseas. The raids of the Vikings along the coast of Britain in the eighth century A.D. are well known. It is thought by many that the Vikings were the first to discover America, sailing across the Atlantic in their frail craft via

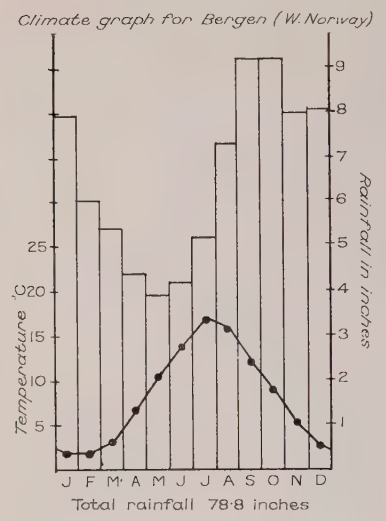


FIG. 9. BERGEN. TEMPERATURE AND RAINFALL GRAPH.

Greenland to Labrador. Fig. 10 shows the merchant marine of the world in 1966. Most of the ships which sail under the flags of Liberia and Panama are owned by American or Greek companies.

14. (*a*) Taking the last sentence into consideration, which countries are first and second in total tonnage?
(*b*) Why does Norway, with a population of 3 million, rank so high?
(*c*) Name two other small European countries which rank high.
(*d*) Suggest why the Russian merchant marine is not larger.

Norwegian ships are found carrying cargoes on all the main shipping routes of the world, few of them ever touching home ports, and money earned from this service contributes largely to the prosperity of the country.

Another country with a long maritime tradition is Greece. If the twelve million tons of Greek owned shipping which sail under a foreign flag were added to the total shown in the graph, Greece would rank third in the world. Fig. 11 shows Ythion, one of the many small ports round the coast of Greece and once the port of

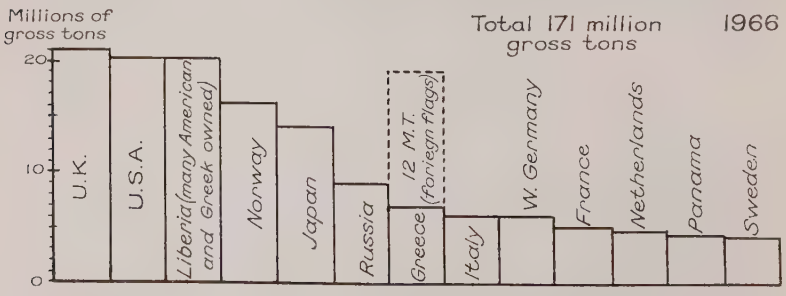


FIG. 10. MERCHANT MARINE 1966.

FIG. 11. YTHION.

the ancient city of Sparta. In the harbour are small boats which fish with nets and lines to supply local needs. Although the Mediterranean has a variety of fish, large shoals are not characteristic. The town climbs the slopes of a limestone spur which protects the harbour from the strong north-west wind, the Garbino, which often blows from the mountains in spring.

In the undulating lowland behind the port there are many garicultural villages. To the west rise the Taygetus Mountains to over 6,000 feet (Fig. 12). The slopes of the mountains, which are formed of limestone and shale, are covered with a sparse drought-resistant scrub called *garrigue* which is grazed by sheep and goats. These herds provide milk and wool which is spun locally and sent to Ythion to be made into blankets. Fig. 13 shows the lower slopes with olive trees, the most characteristic

FIG. 12. POSITION OF YTHION.

drought resisting plants of Mediterranean lands with their gnarled trunks and small silver-green leaves. The fruit which is gathered in November and December is crushed in the villages and refined in Ythion. At a lower level still, figs appear with the

FIG. 13. A GREEK SHEPHERD AMONGST THE OLIVE TREES.

FIG. 14. A FARM SCENE NEAR YTHION.

olives and on the lowest land there is a mosaic of cultivation. Wheat, sown in October and harvested in May is the chief food crop and vines which yield grapes in August and September are important crops for home use. The long tap root of the vine which draws water from the deep sub-soil helps it to withstand the summer drought. Wheat, vine, olive and fig are the traditional crops, grown in ancient Greece and the mainstay of the people for centuries. Today, however, cotton sown in April and picked in October and citrus fruits picked in January have been introduced as cash crops. Cotton is grown on the land nearest the rivers where some irrigation water is available. Fig. 14 shows a typical farm scene in the cultivated lowlands. Although modern machines are being introduced, much work is still done by simple implements.

A weekly steamer from the Piraeus, the port, of Athens, calls at many small ports round the coast, but Ythion is less dependent

on it than formerly. The quickest way to Athens is now by motor road, and most of the agricultural produce is sent that way.

Mountain-girt lowlands such as that of Ythion are typical of the Greek world and indeed of most of the coasts of the Mediterranean Sea. Fig. 15 shows the trends of the young folded mountains formed in Tertiary times by the Alpine Earth Movement (Fig. 6). Between 'Europe' to the north and 'Africa' to the south there was a great trough or geosyncline called *Tethys* which was filled with

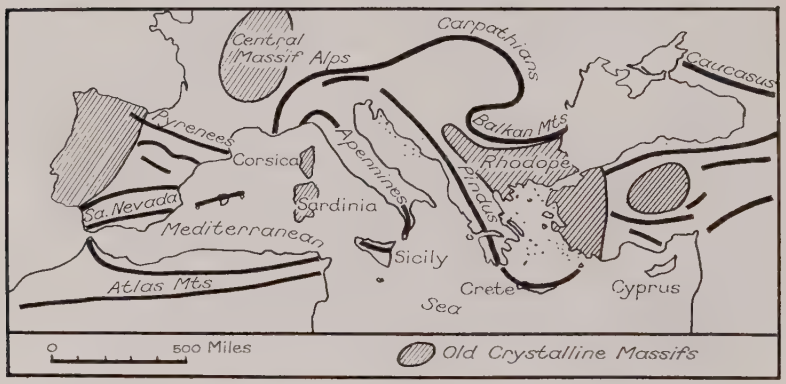


FIG. 15. THE MEDITERRANEAN: TREND OF MOUNTAIN RANGES.

sediments brought down by rivers from the land. When the trough was filled, earth movements exerted pressure on the sides, and the sediments were folded to form complex mountain ranges. The Mediterranean Sea represents the remnants of Tethys.

Fig. 16 shows the temperature and rainfall for Kithira, an island near Ythion. In summer, tropical continental air from the Sahara desert moves north to give settled conditions over the Mediterranean, but in winter Atlantic depressions follow a more southerly course entering the Mediterranean via the Straits of Gibraltar or north of the Pyrenees. The passage of one such depression is shown in Fig. 7 and in the picture taken from a satellite (Fig. 17). In front of a depression winds such as the Etesian wind are often southerly and warm, but behind cold northerly winds may descend from the mountains, the Mistral of the South of France and the Bora of the Northern Adriatic being

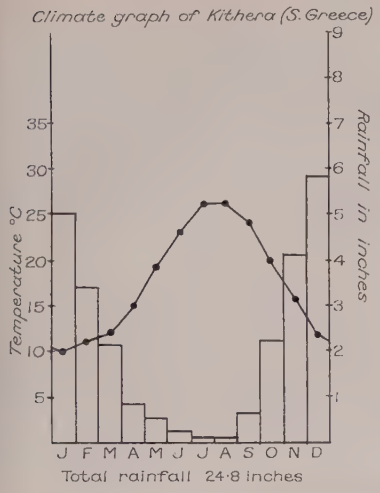
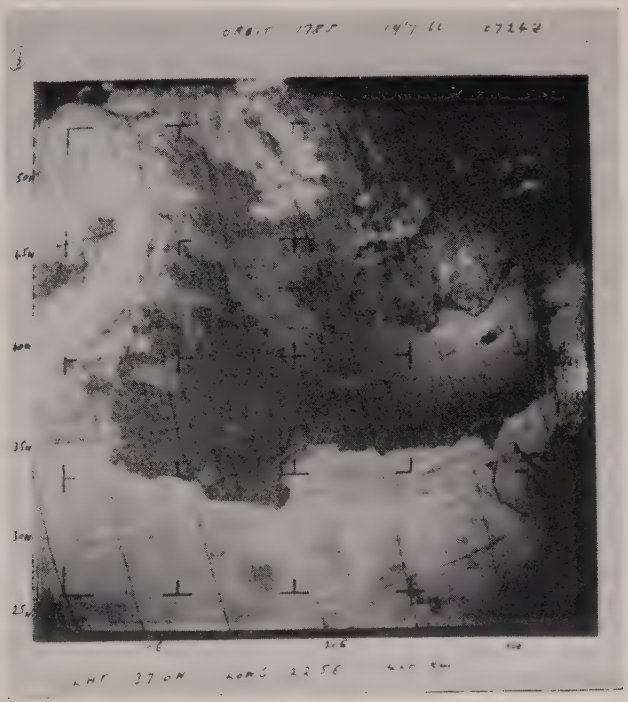


FIG. 16. KITHIRA. TEMPERATURE AND RAINFALL GRAPH.

FIG. 17. PART OF THE MEDITERRANEAN SEEN FROM A SATELLITE.



two well-known examples. This climate of hot, dry summers and mild, unsettled winters is given the name *Mediterranean* climate.

Like the Norwegians, the Greeks have a limited amount of level land so that many centuries before Christ they had set sail to found colonies overseas. Fig. 18 shows the extent of their influence by

FIG. 18. THE MEDITERRANEAN: GREEK COLONIES IN THE SIXTH CENTURY B.C.

the sixth century B.C. The colonies were able to send food, especially wheat, back to Greece. The voyages of the Greek sailors took place mainly in summer. The hazards of winter sailing are well illustrated in the account of St Paul's shipwreck in Chapter 27 of the Acts of the Apostles in the Bible. Paul was being taken to Rome for his trial, in a ship holding 276 people. They were expecting to spend the winter in a sheltered harbour in Crete when a storm arose and blew them westward until, fourteen days later, they were shipwrecked off Malta and managed to get ashore.

Today the Greek merchant marine is based mainly at the Piraeus, and like that of Norway it is of world-wide importance.

15. (*a*) From the account of farming in the Ythion area, construct a circular diagram to illustrate farming in Greece.
(*b*) On your diagram colour in blue the months when there is over 2 inches of rainfall.
(*c*) Which crop needs irrigation and why?
(*d*) Describe the farm scene in Fig. 14.
16. (*a*) What are the traditional Mediterranean crops?

FIG. 19. THE GREEK THEATRE AT SYRACUSE (SICILY).

(*b*) Explain how two of the tree crops are adapted to the climate.
(*c*) What do you understand by garrigue? On what soils does it grow? How is it used?

17. (*a*) Why is fishing in Mediterranean waters much less important than off the coast of Norway?
(*b*) Why are the small ports of Greece less important than they were?

18. (*a*) Draw a sketch based on Fig. 17 showing the belts of cloud associated with the *fronts* of the depressions.
(*b*) Describe the weather in Greece shown in Fig. 7.
(*c*) Using the graph of Kithiron, describe the climate in both summer and winter.
(*d*) Explain the origin of the Garbino at Ythion. Name two similar winds.

19. (*a*) (i) Describe the Greek theatre shown in Fig. 19. (ii) Explain why it was built in Sicily.
(*b*) Name some other countries where Greek ruins may be found.

20. (*a*) It has been said of the Greek world 'On land, never out of sight of sea. On sea, never out of sight of land'. Explain this.
(*b*) What was the significance of this in the early days of navigation?

21. Draw two columns, one headed 'Norway' (Pop. 3·7 m) and the other 'Greece' (Pop. 8·4 m). Make a comparison between the two countries under the headings: Position, Relief, Climate, Vegetation, Farming, Fishing, Maritime Activity.

CHAPTER II

THE PEOPLE'S REPUBLICS OF EASTERN EUROPE

As a result of the Second World War, Germany was partitioned into East and West and the capital, Berlin, was similarly divided. Germany also lost some of her eastern provinces to Poland, the frontier having been moved westward to follow the rivers Oder and Neisse. East Germany is one of six European countries shown in Fig. 20 which together with the U.S.S.R. are members of the Council for Mutual Economic Assistance (COMENCON) set up after the war when the U.S.S.R. assumed a dominant position in Eastern Europe. All the countries have communist governments

FIG. 20. THE PEOPLE'S REPUBLICS OF EASTERN EUROPE.

and are known as People's Republics. They have mutual agreements for technical and financial assistance and their economies are controlled by a series of government plans. These aim to make agriculture more efficient so that fewer people are needed on the land and more are available for employment in developing industries. In this way it is hoped to raise the standard of living for everyone. The table below shows their dependance on the U.S.S.R. and on each other in trade.

Country	*Percentage of Trade with U.S.S.R. 1965*		*Percentage of Trade with other COMENCON members*	
	Import	*Export*	*Import*	*Export*
East Germany	57	42	33	30
Poland	36	41	20	36
Czechoslovakia	38	37	34	33
Hungary	38	37	20	23
Rumania	38	43	20	24
Bulgaria	58	60	20	23

1. (*a*) Which two countries are most dependent on the U.S.S.R. for imports?
   (*b*) Arrange the countries in order of dependence on exports to the U.S.S.R.
   (*c*) Work out the percentage of imports from and exports to the whole COMENCON area for each country.
   (*d*) Arrange the countries in order of dependence on COMENCON for (i) Imports; (ii) Exports.
2. (*a*) With the help of your atlas write a brief account of (i) the relief (ii) the drainage of the six countries noting particularly the areas of lowland and the countries which are drained to the Baltic and Black Seas respectively.
   (*b*) (i) Which of the countries form part of the North European Lowlands?
   (ii) Which of the countries offer an easy routeway between U.S.S.R. and Western Europe?

Fig. 21 shows the three most northerly republics, East Germany (population 17 million), Poland (population 30 million) and Czechoslovakia (14 million). We will look first at some of the more important features of the North European lowlands. In particular, it is important to remember that much of this area was for a long time covered with ice and that, as the ice finally melted, the *melt water* was trapped between the edge of the *ice sheet* and the highlands to the south. It was this water which, trying to find an outlet

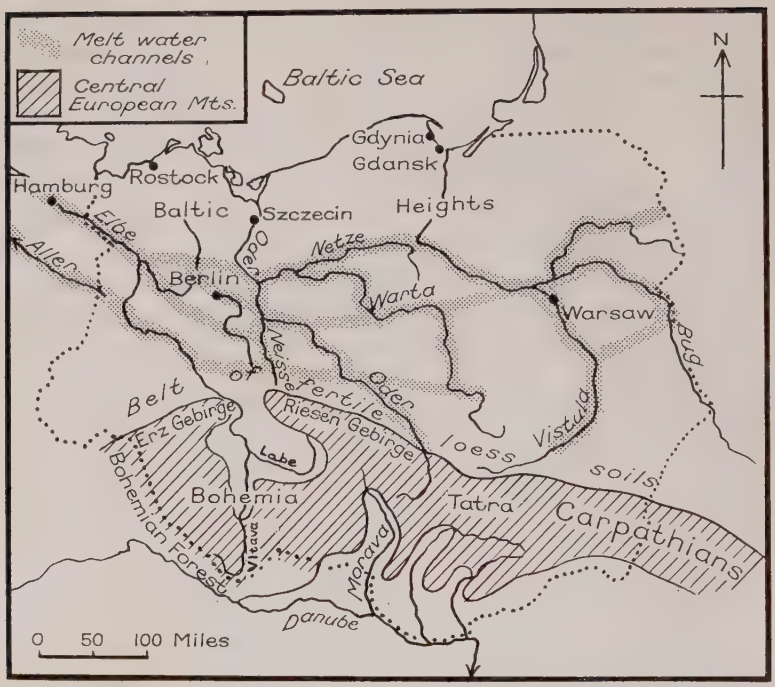


FIG. 21. EAST GERMANY, POLAND AND CZECHOSLOVAKIA (PHYSICAL).

to the east and to the west formed the *urstromtäler* or wide east-west channels which have so obviously influenced the courses of the present rivers.

The ice sheet, did not, however, reach the southern part of the lowland although the belt lying along the northern flank of the highlands owes its very great fertility to a very fine deposit called *loess* which is probably a fine dust blown from the dry glacial deposits during the bitterly cold winters. This is similar to the loess described in Book 3 (pages 382–3). *Moraines* are mixed deposits dumped by the melting ice. Often, as in the Baltic heights, where the edge of the ice sheet remained in more or less the same position for many years, these dumps form lines of quite large hills. Pages 175 to 180 in Book 3 deal with the deposition of moraine by ice.

FIG. 22. ICE BREAKERS AT WORK IN THE RIVER WARTA IN FEBRUARY.

The frontier between Czechoslovakia and her northern neighbours runs through the mountains of Central Europe. Czechoslovakia consists of two sharply contrasted regions, the ancient plateau lands of Bohemia and Moravia in the west, the homeland of the Czechs and the complex folded mountain ranges of the Carpathians on the slopes of which live the Slovaks.

3. (*a*) The Baltic coast is a typical 'sandspit and lagoon coast'. Draw a sketch map of part of the coast to illustrate this.
   (*b*) Draw a sketch section from north to south to show the coastline, the Baltic Heights, the urstromtäler, the loess belt and the mountains of Central Europe. Add brief notes on each feature shown on your sketch section.
   (*c*) Where is the remnant of the ice sheet found today?
4. (*a*) Draw a sketch map to show the course of the river Oder and add a note of explanation.
   (*b*) What is the main routeway between Czechoslovakia and (i) East Germany; (ii) Poland?
   (*c*) Draw a sketch map of the Plateau of Bohemia showing (i) the mountains which form its rim; (ii) the Labe (Elbe) and its tributaries; (iii) the position of Prague.
   (*d*) Before the war Hamburg was the chief port for Czechoslovakia. Now it has been replaced by Rostock and Szczecin. Explain this change.

Fig. 22 shows five of a fleet of sixteen Polish and German ice breakers at work in the Warta tributary of the Oder in February. They are pushing ice down towards the estuary. The severe winter which this picture suggests is caused by cold, dry, heavy air known as *polar continental* (see Book 3, page 233) which dominates the climate of this area in winter. In summer, Atlantic depressions are able to penetrate far inland bringing rain. Distance from the cooling effect of the sea means that summer temperatures are higher than those of coastal places in the same latitude. This type of climate is known as a *Continental Climate.*

5. (*a*) Refer to Fig. 7 and make a table to show the weather characteristics at Warsaw, Berlin and Prague.
(*b*) Using this information, describe the air stream which is affecting this part of Europe.
(*c*) Compare the temperatures of these places with those of west Norway and account for the difference.
6. (*a*) Draw a graph to illustrate the climate of Warsaw.

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	−4	−5	1	8	14	16	19	18	14	9	2	−2	
Rainfall ins.	1·2	1·1	1·3	1·5	1·9	2·6	3·0	3·0	1·9	1·7	1·4	1·4	22

(*b*) What is (i) the highest temperature; (ii) the lowest temperature; (iii) the range of temperature?
(*c*) Compare the range of temperature with those of Bergen and Kithira (Chapter I).
(*d*) Account for the distribution of rainfall.
(*e*) Using the graph, write a paragraph on the characteristics of a continental climate.
(*f*) Suggest why ice breakers are needed in the mouth of the Oder and not in that of the Elbe.

Farming is still an important occupation in these three countries though the proportion of people engaged in it has fallen since the war. In East Germany and Czechoslovakia most of the land is now in *collective farms* similar to those of U.S.S.R. (Book 3, page 246). The farms are served by machine-tractor stations and most of the produce is sold to the State at fixed prices. In Poland however, 90 per cent. of the land is still in private ownership but most farmers belong to co-operative organisations for buying and marketing. Large State farms produce seeds. The aim of farming policy in all three countries is to increase productivity by employing more scientific methods such as use of machinery, selected

seeds and fertilisers. The kind of farming practised is closely related to the physical conditions shown in Fig. 21. Both East Germany and Poland have four main farming regions.

1. The Baltic coastlands between the sea and the Baltic Heights are made up of heavy *boulder clay* left behind by the retreating Ice Sheet (Book 3, page 118). Rye, wheat, potatoes and fodder crops are grown, the two latter crops being fed to dairy cattle and pigs, which are the chief source of farm income.

2. The central region has large areas of sandy soil with much heath and forest. Where the land is cultivable rye and potatoes are the chief crops. There is meadowland along the damp urstromtäler.

3. The *loess* region. This is a discontinuous zone along the foot of the mountains. It has long been cleared for cultivation and settlement. Wheat and sugar-beet are the chief crops and cattle and sheep are stall fed.

4. The uplands to the south are heavily forested but mixed farming is carried on where slopes are favourable.

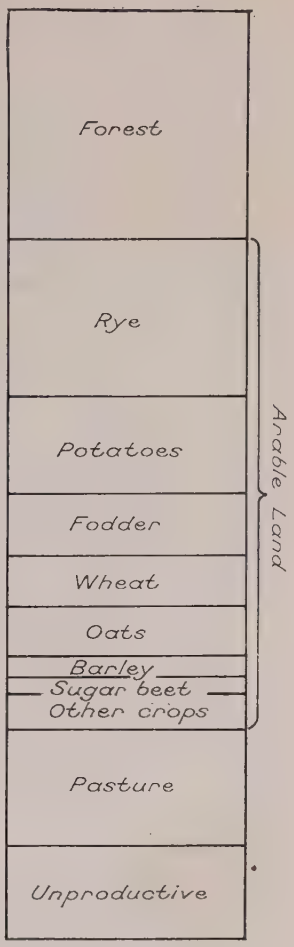


FIG. 23. LAND USE IN POLAND.

Beyond the mountains in Czechoslovakia there is good agricultural land in the valleys of the Labe and Morava. Wheat occupies one half of the cultivated land in the country and rye only a quarter. Fruit growing is carried on round Litovice in the Labe valley north of Prague, while hops are extensively grown in the Eger valley to the west. In southern Moravia crops of more southerly latitudes—vines, tobacco and maize—can be grown.

7. Study Fig. 23 which shows how the land in Poland is used.
   (*a*) Account for the high proportion of forest and note the main forested areas.
   (*b*) The amount of pasture land is small but stock raising accounts for two-thirds of the farm income. Why is this?
   (*c*) Rye, oats and potatoes are crops of the poorer soils. What proportion of the land do they occupy and why?
   (*d*) Wheat and sugar-beet are crops of the richer soils. What proportion of the land do they occupy and why?
8. (*a*) Draw a sketch map of East Germany and Poland to show the four agriculture regions.

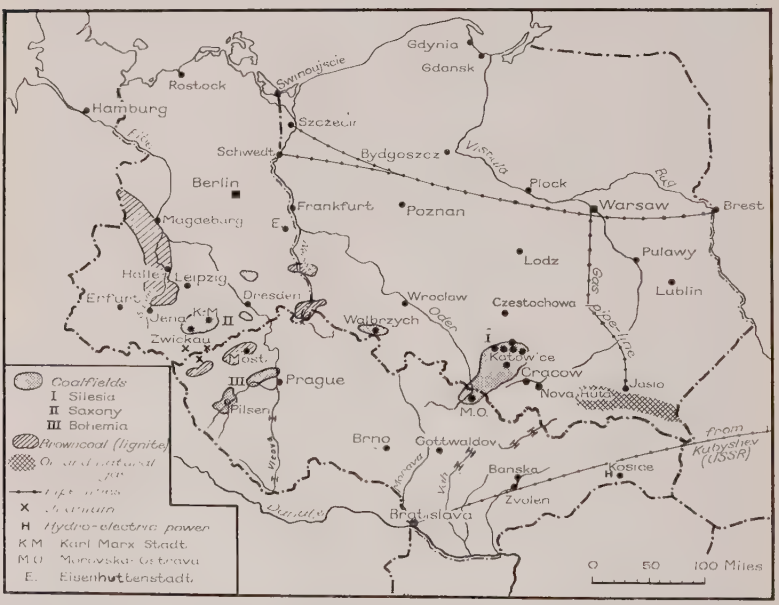


FIG. 24. INDUSTRIAL MAP OF EAST GERMANY, POLAND AND CZECHOSLOVAKIA.

Before the Second World War, East Germany, Bohemia and Moravia had well-developed industries but much of Poland and Slovakia were *under-developed* with agriculture as the main occupation. Great efforts have been made to increase industrial production under State plans. In 1930, 60 per cent. of the population of Poland was engaged in agriculture compared with 40 per cent. today.

Fig. 24 shows the distribution of power resources on which industrial development depends. The most important coalfield is that of Silesia which was Germany's second coalfield before the war. It has large reserves of thick seams and with the smaller Walbrzych field makes Poland the sixth coal-producing country in the world with an annual production of 117 million tons. There are smaller coalfields in Saxony (East Germany) and in Bohemia.

Brown coal or *lignite* is widespread particularly in East Germany, which accounts for over one-third of the world's production. It is obtained by open-cast methods in huge quarries (Fig. 25) and is used mainly in electric power stations. Some is used as a raw material in the chemical industry.

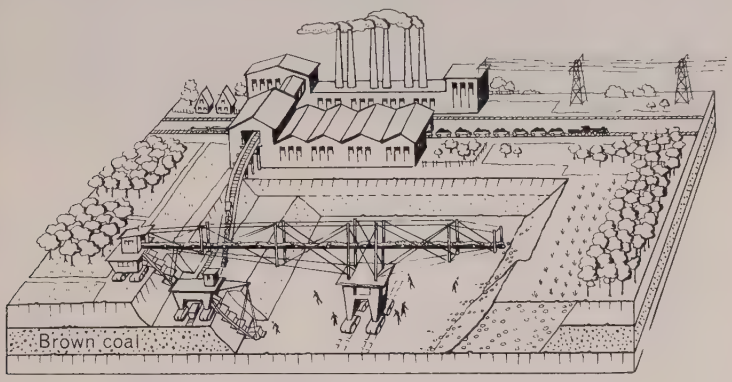


FIG. 25. A LIGNITE QUARRY.

Some oil and natural gas are found at the foot of the Carpathians in Poland and there is active prospecting going on. There is a little oil in southern Moravia. All three countries, however, are heavily dependent on the U.S.S.R. for oil, which is distributed by the 'Friendship Pipe Lines' one of which crosses Poland to the East German oil refinery at Schwedt on the Oder while the other crosses Czechoslovakia to Bratislava and goes on to Budapest. This is one of several factors which gives the Soviet Union considerable influence in these countries.

Czechoslovakia has the greatest hydro-electric power resources with a large modern scheme at Slapy on the Vltava, and in the Vah and Orava valleys in the Slovakian Mountains. The Erz

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FIG. 26. THE STEEL WORKS AT NOVA HUTA.

Gebirge (Ore Mountains), which separate East Germany and Czechoslovakia, are the chief source of *uranium*, vital in the development of *atomic energy*, in the Communist countries.

9. Comment on the distribution of power resources in relation to the mountains.
10. Study Fig. 25 and describe how lignite is produced and used.
11. (*a*) Describe the power resources of each of the three countries.
    (*b*) Note any significant deficiencies.

Industry in East Germany has long been established, the zone at the foot of the mountains having been described as 'the oldest community of craftsmen in Europe'. Timber from the forests, wool from local sheep and a variety of ores were the raw materials while fast flowing streams provided power. Most of the ores are now exhausted, but factories remain, producing goods where skill is more important than raw materials. Amongst the metal goods produced are instruments, tools, watches and clocks; china, glass, cameras and optical instruments are also important. Textile and clothing industries are widespread, as are timber-using industries, such as toys, furniture and paper.

Farther out on the plains in the Leipzig area, chemical industries are all-important. These use potash found in the west of the country and salt found at the foot of the Harz Mountains, as well as local lignite. Heavy chemicals such as ammonia, soda, sulphuric acid, and synthetic fuel are produced and, more recently, synthetic rubber, fibres and polythene. The greatest works are the Leuna Works near Halle. Before the war this area depended on the Ruhr coalfield, now in West Germany, for iron and steel and heavy engineering products. To make up this loss, new iron and steel works have been set up at Magdeburg and the new town, Eisenhuttenstadt, near Frankfurt on Oder. Many steel-using industries are located in East Berlin, the capital, and there has been striking development of shipbuilding at Rostock, the chief port.

The table below shows the chief towns and industries of East Germany.

Town	*Population*	*Industries*
East Berlin	1,200,000	Machinery, Electrical equipment Printing, Chemicals
Leipzig	600,000	Chemicals, Engineering, Textiles Clothing, Printing
Dresden	490,000	Iron and Steel, Optical and precision engineering, Glass
Karl Marx Stadt	250,000	Textiles, Machinery
Magdeburg	236,000	Iron and Steel, Engineering Chemicals, Sugar refineries
Halle	222,000	Chemicals, Engineering, Vehicles
Erfurt	174,000	Textiles, Clothing, Engineering
Zwickau	122,000	Textiles, Machinery
Rostock	115,000	Shipbuilding, Engineering

12. Study the table of industries and Fig. 24.
(*a*) Rearrange it by putting the name of each industry on the left and the names of the towns on the right.

(*b*) The Zeiss works of Jena are world famous. What is made there?
(c) Oil is replacing lignite as a raw material in the chemical industry. Where does East Germany obtain supplies?
(*d*) Karl Marx Stadt is a great centre for the manufacture of cotton and woollen cloth. (i) What source of power helped in the establishment of textile industries? (ii) What new raw materials are now available and how are they obtained?
(*e*) In the newly established iron and steel works suggest (i) the source of the coking coal; (ii) sources of iron ore.
(*f*) Give reasons why the belt of low land at the northern foot of the mountains of Central Europe is densely populated.

Poland's main industrial region is on the Silesian coalfield, most of which was in pre-war Germany. One town succeeds another in an *industrial conurbation*, Katowice being the largest. Local lead and zinc ores have long been smelted and there are huge iron and steel works. The most modern works however, have been established beyond this overcrowded area at Czestochowa and at Nova Huta, a suburb of the ancient city of Krakow. Fig. 26 shows the latter works which produce $3\frac{1}{2}$ million tons of steel each year, an amount greater than the total Polish production before the war. Lodz, which has a population of 1·6 million, is Poland's largest city and has varied industries, particularly textiles. Most of the old cities of Poland have old-established industries and it has been government policy in recent years to develop these further and to distribute industry widely. Thus engineering, chemical and textile industries are found in most of the towns marked on Fig. 24. New developments include petrochemicals and artificial fibres at Plock, nitrogen fertilisers at Pulawy and shipbuilding in the ports of Gdansk and Gdynia. Warsaw, the capital, situated in the heart of the Polish lowlands, in common with many East German and Polish cities has been rebuilt since the war, and as well as being an administrative and cultural centre, manufactures cars, agricultural and other machinery, textiles and chemicals. Szczecin at the mouth of the Oder is an important port with engineering, textile and paper industries while Swinoujscie, its outport, is Poland's chief fishing port.

13. (*a*) Study Fig. 26 and describe what you see.
(*b*) Refer to Fig. 24 and suggest why Plock has developed as an industrial centre.
(*c*) What industries mentioned above help in improving agricultural production?

The Silesian coalfield extends into Czechoslovakia where Moravska-Ostrava has iron and steel and engineering works originally using local iron ore. A new iron and steel works has recently been built. The great iron and steel works at Pilsen grew up on a small coalfield while the electrical and transport-engineering industries of Prague are supplied from the Kladno coalfield. More recently, chemical and synthetic-fuel industries have grown up on the brown coalfield at Most. As in East Germany, there are many old-established small industries such as textiles, machine tools, glass, jewellery and toys. Other centres are:

Brno	The chief industrial centre of Moravia. Textiles, Engineering.
Bratislava	Danube port. Textiles including synthetic fibres, Chemicals, Rubber, Engineering.
Gottwaldov	The world-famous Bata shoe factory.

All the above industries are in Bohemia and Moravia but it is government policy to develop Slovakian industry as the following table shows.

Index of Industrial Production

	1937	*1948*	*1955*	*1960*	*1963*
Czechoslovakia	100	108	243	403	464
Czech regions	100	102	219	355	403
Slovakia	100	196	538	1,025	1,233

Near Kosice is one of the largest iron and steel works in Central Europe. The development of hydro-electric power has led to the establishment of aluminium works at Zvolen and at Banska there has been great development of timber-using industries for houses, furniture and paper. An interesting example of this dispersal of industry is found in the Orava Valley in the Tatra Mountains where nearly all the country's television sets are made at a factory called Tesla Orava. Many of the 3,000 workers at the factory live in neighbouring country villages and others are housed in new blocks of flats.

FIG. 27. PRAGUE.

14. (*a*) Draw a block graph to show the growth of industries in Czechoslovakia.
(*b*) How many times has industry increased since 1937 (i) in the Czeck regions; (ii) in Slovakia?
15. (*a*) What power is available at the Tesla Orava factory?
(*b*) What local raw material is available for producing television sets?
(*c*) Some components of the television sets come from other industrial areas. Why is it worthwhile to bring them to Tesla Orava?

Prague, the capital city of Czechoslovakia (population 1 million) and the historic capital of Bohemia, is situated in the deep valley of the Vltava where the river was fordable. Fig. 27 shows the Hradcany fortress, the administrative centre and the Cathedral of St Vitus. The medieval Charles Bridge links this part of the city with the commercial centre on the right bank.

Prague is the centre of the country's railway network. Before the war, the main direction of communication was south-north as Hamburg was Czechoslovakia's chief trade outlet. Today, the trade trend is mainly west-east as Slovakia becomes developed and the whole country relies upon the U.S.S.R. The new electrified railway shows this trend. The Oder-Danube Canal, which will greatly improve the transport of heavy goods across Czechoslovakia, is under construction.

Fig. 28 shows the three smaller People's Republics, Hungary (population 10 million), Rumania (population 18 million) and Bulgaria (population 8 million), linked by the great River Danube which also flows through northern Yugoslavia.

16. Study Fig. 20 and Fig. 28.
(*a*) Compare the size of Hungary, Rumania and Bulgaria with the total area of the East European bloc.
(*b*) Describe the course of the River Danube from Bratislava to the sea, naming the major tributaries and noting the various lowland areas and the mountains which separate them.
(*c*) In what parts is the river an international frontier?
(*d*) Describe the trend of the Carpathian Mountains from Slovakia to the Iron Gates.

The Danube changes character completely as it enters the Kazan Gorge between the Carpathians and the Balkan Mountains. One traveller has described it as follows:

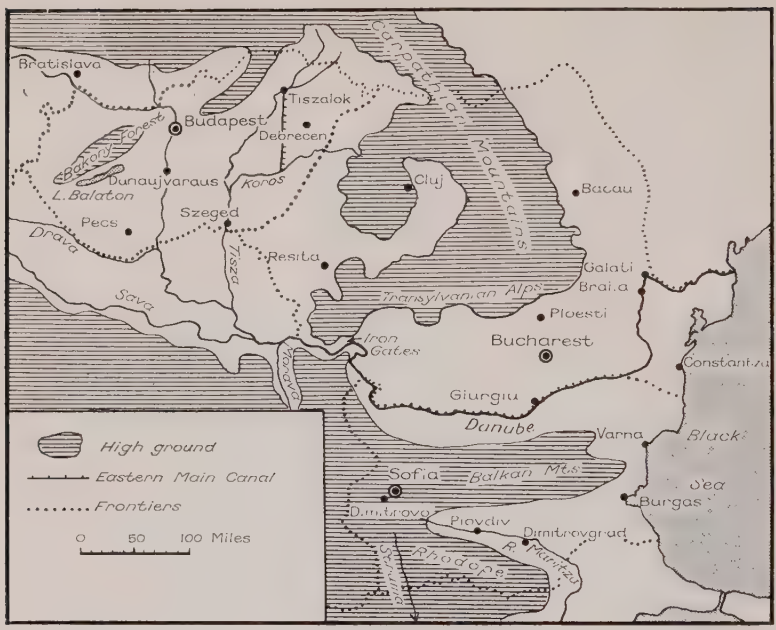


FIG. 28. HUNGARY, RUMANIA AND BULGARIA.

Imagine a mighty rushing river passing between high and picturesque mountains, indescribably wild. Great cliffs fall almost perpendicularly from a height of 2,000 feet sheer to the water's edge. Until the road was made, its site blasted from the unwilling mountain, not even a goat could have made his way along the banks of the Danube. The gorge is not one straight canyon: the river twists and turns, ever seeking an easier egress from this enchanting belt of mountains.[1]

The place where the river breaks free from the mountains is called the Iron Gates, where the swift current and the jagged rocks from the river bed were long an obstacle to navigation. A new channel has been blasted on the right bank of the stream. Here navigation is safe but the current is swift enough for boats proceeding upstream to require assistance by towing. Below the Iron Gates, the plain broadens and the river flows to its mouth in the Black Sea.

[1] B. Newman. *Still flows the Danube*, H. Jenkins.

In 1964 work on the Iron Gates hydro-electric and navigation scheme was begun in co-operation with Yugoslavia. A dam 130 feet high is being constructed with two power stations and locks. Ocean-going vessels will be able to proceed to Belgrade (500 miles) in 1971.

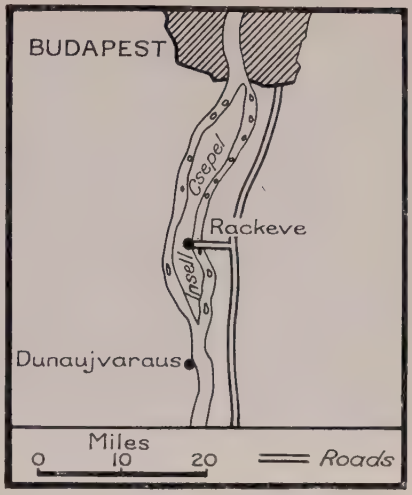


FIG. 29. RACKEVE ON THE DANUBE IN HUNGARY.

The farmers of Hungary, Rumania and Bulgaria live mainly in the extensive lowlands of the Danube. They are now organised into collective farms, typical of Communist countries. Fig. 29 shows the village of Rackeve situated on an island in the River Danube south of Budapest. The enormous amount of silt carried down by the river has caused choking of its bed and the river has divided into two channels. This is called *braiding* and is characteristic of the course of the Danube. The soil is coarse and not very fertile but it has long been under the plough. Today the twelve square miles of farmland round the village is divided into three collective farms (7,500 acres in all). Large fields have replaced the small plots of land of the past and tractors, modern ploughs and other machines are used to produce crops of wheat, maize and fodder and yields are increased by the use of fertilisers. Vegetables for sale in Budapest are also grown, including lettuces in glasshouses. Large numbers of cattle and pigs are reared and electricity is used to drive the milking machines and fodder cutters. In addition to the wages received for work on the farms, each worker is allowed a private plot of about one acre where maize, vines and red peppers are grown, and it is possible to rear two cows and a few pigs. Most of Rackeve's population of 8,500 live by farming but fishing in the Danube and work in the city are other occupations.

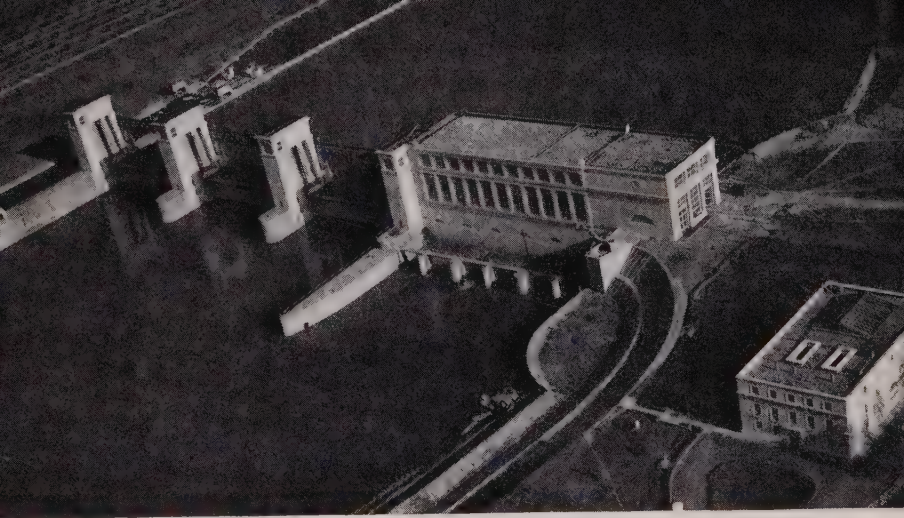


FIG. 30. TISZALOK DAM.

17. Study Fig. 29.
    (*a*) Estimate the area of Insel Csepel.
    (*b*) What proportion of the island is the farmland of Rackeve?
    (*c*) How far is Rackeve from Budapest?
    (*d*) How has proximity to the city affected the farming?
    (*e*) Suggest why there are so many islands in the river.
18. (*a*) Draw a graph to show the temperature and rainfall of Budapest.

BUDAPEST

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	−1	1	7	12	17	20	22	21	20	12	5	1	
Rainfall ins.	1·5	1·5	1·7	2·0	2·7	2·6	2·0	1·9	1·8	2·1	2·4	2·0	24·2

    (*b*) What type of climate is this?
    (*c*) How does the summer climate favour the growth of cereals?
19. Compare the land use of Hungary with that of Poland (Fig. 23). Arable 67 per cent. Forest 18 per cent. Grassland 14 per cent. What differences or similarities do you find?

Rackeve is more prosperous than most farming villages in these countries as it is near to the capital but farms in all parts are moving towards this standard. East of the Danube are the great treeless plains known as *puztas* many of which are too dry for successful cultivation and were used for horse, cattle and sheep rearing. Today much land is being irrigated especially from the Tiszalok Dam (Fig. 30). Water is taken by canal (Fig. 28) to bring the eastern part of the plain under cultivation and also to provide hydro-electric power. Cotton, rice and vegetables, sugar-beet and

FIG. 31. MAIZE GROWING ON A RUMANIAN COLLECTIVE FARM.

tobacco are grown as well as wheat and maize. Fig. 31 shows a maize field on a collective farm in Rumania.

In Bulgaria, there are now only 1,000 farms in the whole country, with an average size of 11,000 acres instead of many thousands of very small peasant holdings. The people work in brigades, the men doing the heavier work such as driving tractors

FIG. 32. PICKING ROSES IN BULGARIA.

and combine harvesters and tending the cattle and pigs, while the women do lighter work which requires nimble fingers, such as picking cotton and fruit and working in the packing sheds. Fig. 32 shows the picking of roses to make attar of roses, a famous perfume. Not all the people on a collective farm are employed in the fields. There is need for skilled mechanics, accountants, veterinary surgeons, agricultural advisers and shopkeepers. As the farms become more efficient much rebuilding is needed and many are employed in brick and tile making and building houses. Fig. 33 shows a new village. As at Rackeve each family has its private plot.

In the Danube Valley, wheat, maize and fodder crops predominate but beyond the Balkan Mountains in river valleys and plains there is a great increase in fruit and vegetables particularly in the Maritsa valley. Indeed, this area is the chief supplier of fruit and vegetables for the Communist countries and there is considerable export to the U.S.S.R. in exchange for much-needed machinery.

In the Struma Valley in the far south west of the country a huge collective of 40,000 acres employs 2,300 people. Here the chief crop is tobacco, grown in rotation with wheat, maize and vegetables. Two crops a year are gathered, one planted in April and picked in July and the other planted in July and picked in November. Cotton is grown and picked in September. Fig. 34 shows

FIG. 33. HOUSES ON A BULGARIAN COLLECTIVE FARM.

FIG. 34. YOUNG PIONEERS PICKING COTTON IN BULGARIA.

children of the Communist Youth Movement (Pioneers) helping with the picking. Another major product is peaches of many different varieties which can be picked continuously from June to November. Grapes which are picked in September are used for dessert and to produce wine and dried fruit. In addition to all this oranges, lemons, olives and figs and a wide variety of vegetables can be seen on this farm. Fodder crops are grown to feed the sheep and cattle. Irrigation is needed in July and August.

20. (*a*) Compare the size of the three collectives at Rackeve with the Struma Valley collective.
(*b*) Study the picture of the Rumanian collective and describe it, noting (i) type of land; (ii) farming methods.
(*c*) Describe the village in Fig. 33.
(*d*) In what part of the country was the picture probably taken?
(*e*) Draw a diagram to show work throughout the year on the Struma Valley collective.

21. (*a*) Consult your atlas to find out the distance from the southern frontier of Bulgaria to the Mediterranean Sea.
(*b*) Suggest why irrigation is necessary in the Struma valley in summer.

22. Study Fig. 35 which shows work in the orchards.
(*a*) What two jobs are going on?

FIG. 35. WORK IN THE ORCHARDS IN BULGARIA.

(*b*) Suggest why this is work for the men.
(*c*) Why are the young Pioneers used in the cotton fields?

These three countries are predominantly agricultural and likely to remain so as their power and mineral resources are limited. Nevertheless great efforts to industrialise are being made mainly to supply the home market. Hungary's chief mineral is bauxite mined in the Bakony Forest, smelted at Ajke and sent to U.S.S.R. for further processing. Fig. 28 shows the position of Dunaujvaraus, where Hungary's great steel works have been built using Russian ore and coal from the Pecs coalfield in the south-west. It supplies the engineering works which make farm, transport and electrical equipment in Budapest. Rumania's steel works using Russian ore and coal are in the west of the country at Resita and Hunedora (Fig. 36), while Bulgaria's are at Dimitrova, south-west of Sofia, where there is a small coalfield. At Dimitrovgrad in the Maritsa Valley, there are iron and steel works and new chemical works which produce fertilisers.

The greatest resources are provided by the oil produced in Rumania in the gently folded strata at the foot of the Carpathians. Ploesti and Bacau are the chief centres. Fig. 37 shows a refinery near Ploesti. Pipelines take the oil to Giurgiu on the Danube.

FIG. 36. AN INDUSTRIAL SCENE AT RESITA—RUMANIA.

Natural gas has recently been discovered in the heart of Transylvania. Bulgaria's oil refinery fed by Russian oil is located at Burgas on the Black Sea, while Hungary's refineries near Budapest are fed by the Friendship Pipe Line.

FIG. 37. AN OIL REFINERY NEAR PLOESTI—RUMANIA.

23. Suggest reasons for siting the steel works at Dunaujvaraus.
24. Study Fig. 36. The steel works are in the centre of the picture.
    (*a*) What other industries can be identified?
    (*b*) What are the hills in the background?
25. Study Fig. 37.
    (*a*) Where are the storage tanks?
    (*b*) What are the hills in the background?
    (*c*) Why is oil often found in foothill country?
26. Read through the above account and note down examples of these countries' dependence upon U.S.S.R.
27. What heavy cargoes are carried along the Danube and what is the main direction of movement?

In each of these three countries only the capital cities are large by modern standards. They are:

Budapest (population 1.8 million). The hill of Buda on the west side of the Danube is the ancient fortress town and the seat of government. It is linked by bridge to the more modern industrial town of Pest on the east. In addition to heavy engineering there are chemical, textile and other consumer-goods industries.

Bucharest (population 1 million). The city is centrally situated in the plains of Walachia but with no striking advantages of site. Engineering, chemical and textile factories as well as an important state printing works are found there.

Sofia (population .75 million). This lies in a fertile mountain basin. It is on the main railway route from Western Europe to Istanbul. A traveller described it as follows:

> The view from my hotel window in Sofia was typical of the whole city. In the foreground, an ancient Byzantine-style church, tram-cars, neatly fenced-in patches of grass and trees, backed by imposing early Communist-style buildings. Round the corner and forming a backdrop to most of Sofia's views rise the impressive bulk of Mount Vitosha, rising to a sudden astonishing 5,500 feet above Sofia's 2,000 feet.[1]

There is no great port at the mouth of the Danube though Braila and Galati are river ports and Constanta is a seaport.

[1] Kathleen Wylie, *Times Educational Supplement*, 14 October 1966.

Using your atlas

28. (*a*) Draw a sketch to show the mouth of the Danube.
(*b*) Suggest why there is no great port there.
(*c*) Name other rivers which have similar mouths in (i) Egypt; (ii) U.S.A.; (iii) India.

29. Icebreakers are needed to keep Galati open in midwinter. Suggest why this is necessary when the Norwegian fiords are ice-free.

30. (*a*) Draw a sketch map to show
(i) the six countries dealt with in this chapter;
(ii) the rivers Elbe, Oder, Vistula and Danube;
(iii) the mountains Erz Gebirge, Giant, Carpathians;
(iv) the six capital cities.
(*b*) Draw a thick coloured line to divide the countries with an industrial basis from those with an agricultural economy. Add an appropriate key.
(*c*) In the margin of the map list all the points of similarity between these six countries.

31. Write a paragraph on the relation between politics and economic development in Eastern Europe.

32. (*a*) List the People's Republics of Eastern Europe with their capitals.
(*b*) Write a brief description of the site of each city.
(*c*) State one special feature about Berlin.

33. (*a*) Find out all you can from newspapers and magazines about the latest economic plan for (i) Britain and (ii) one of the People's Republics of Eastern Europe.
(*b*) Which of the two plans exercises the greater control over economic activity?

CHAPTER III

NORDEN

LYING north of West Germany and east of Russia, two large and powerful neighbours, are four countries: Denmark, Norway, Sweden and Finland. Together they are known as Norden. Norway, Sweden and Denmark together are sometimes called Scandinavia. These four countries have much in common for, despite their northerly position and other unfavourable geographical conditions, they are prosperous countries whose people enjoy a high standard of living. In 1962 they were drawn closer together by a Treaty of Co-operation. Farming, fishing, forestry, mining and manufacturing are the chief occupations of Norden but their relative importance in each country depends on its particular geographical conditions. The figures below show the percentage of land in each country used in different ways.

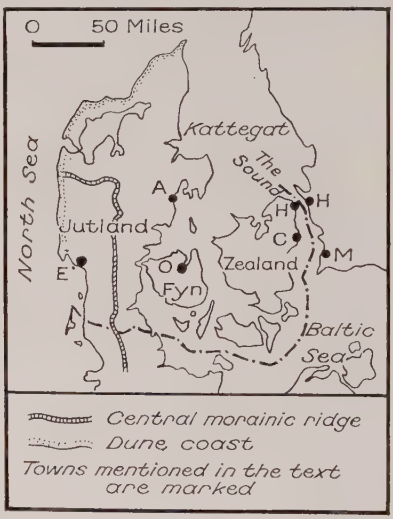


FIG. 38. DENMARK.

	Arable and Gardens	*Hay and Pasture*	*Woodland*	*Unproductive Land*
Denmark	64	9	10	17
Norway	3	1	23	73
Sweden	8	2	50	40
Finland	8	1	64	27

1. (*a*) Draw four bar graphs to illustrate these figures and colour in appropriate land-use colours.
(*b*) In which country is farming most important? With the help of your atlas suggest two reasons why.

FIG. 39. RECENTLY RECLAIMED LAND IN WEST DENMARK.

(*c*) Which country has most unproductive land and why?
(*d*) For each country, note the latitude of the most southerly and most northerly parts. Which country has the greatest latitudinal extent?
(*e*) Which country has the greatest territory within the Arctic Circle?

Denmark

Denmark stands out from the others as having nearly three-quarters of its land in farms. Though low-lying, the relief is varied as Fig. 38 shows. The central ridge which rises to 300 feet in places is the irregular terminal moraine of the ice sheet which moved outwards from the Scandinavian mountains in the Great Ice Age. The moraine is a continuation of the Baltic Heights (Fig. 21). Consisting of coarse material, it gives rise to infertile soils and is generally left as heath or planted with trees. To the east is hummocky country of boulder clay spread by the ice sheet giving rise to good agricultural lands. The submergence at the end of the Ice Age has divided the area into many islands. To the west of the morainic ridge is a sandy outwash plain consisting of coarse fluvio-glacial material spread by the melt waters at the edge of the ice sheet. Before reclamation in modern times, much of this was sandy heath country with sand dunes along the coast. Belts of trees are often planted to hold the sand. Fig. 39 shows a

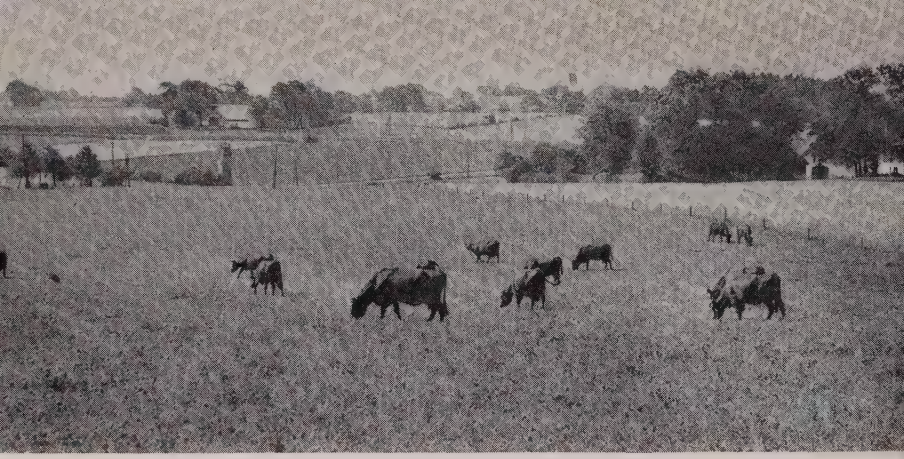


FIG. 40. A TYPICAL FARM LANDSCAPE IN EAST DENMARK.

typical scene. The land has been cleared and fertilized to produce crops of hay and rye.

Fig. 40 shows a typical farming landscape in the east. Farms are small (50 to 70 acres) and scattered. The buildings, which are thatched or tiled, are grouped round a courtyard. A herd of Red Danish cattle is grazing on rotation grass, their movements being controlled by a moveable electric fence. In winter the animals are kept in their stalls and fed on hay, silage and roots.

Fig. 41 shows the layout of a large farm in Jutland. The buildings date from the nineteenth century but were enlarged and modernised thirty years ago.

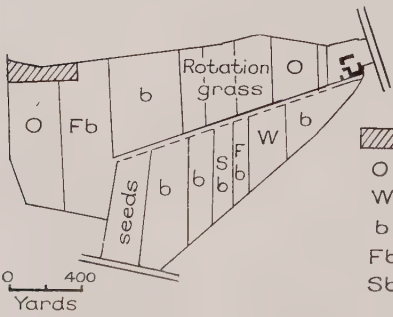


FIG. 41. GRONVANG: A DANISH FARM.

N.B. *There is another meadow a short distance away*

Animals	*Machinery*	*Labour*
2 Mares	1 Tractor	The Farmer
34 Cows—tuberculin tested	Plough	1 Cattle man
35 Young stock	Harrows	2 Farm hands
20 Sows	Horse-hoe	
70 Suckling pigs	Sprayer	*Acreage*
100 Bacon pigs	Harvesting implements	110
200 Hens	Milking machines	

For a farm which carries so much stock, it is surprising to find only three meadows. With the exception of wheat and grass seed, all the crops are used to feed the animals. Grasses are sown and take their place in the rotation, remaining for three or four years before the land is ploughed. Clover is sown with the barley and can be cut for silage in November after the barley has been harvested.

2. (*a*) Draw a sketch section across Denmark from west to east showing (i) the dune coast; (ii) the outwash plain; (iii) the morainic ridge; (iv) the boulder clay country; (v) the islands.
   (*b*) Why is Denmark sometimes described as 'a morainic archipelago'?
3. (*a*) Describe the scenes in Figs. 39 and 40.
   (*b*) What are the main differences between them?
4. (*a*) Copy the plan of Gronvang into your notebook and colour with appropriate land-use colours.
   (*b*) List the crops in order of importance.
   (*c*) How does the farmer use rotation grasses?
   (*d*) What details suggest that the farm is modern?
   (*e*) What are the products sold by the farmer?
5. (*a*) Using the following figures, draw a temperature and rainfall graph for Copenhagen.

COPENHAGEN

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	0	0	2	6	11	15	18	17	13	9	4	2	
Rainfall ins.	1·6	1·3	1·2	1·7	1·7	2·1	2·2	3·2	1·9	2·1	2·2	2·1	23·3

   (*b*) State the names of the months which have a temperature of 6°C or over, i.e. when plants start growing.

Denmark has long had a reputation for efficient farming based on a high standard of agricultural education, the application of science to agriculture and the co-operative system. Farmers may

belong to several co-operative societies whose management committees are elected by the farmers themselves. Seeds, fertilisers, feed-stuffs and machinery are purchased through such societies, but it is for the marketing of produce that co-operative societies are most famous. The milk from the farms is sent to co-operative creameries where it is separated, the cream being used to make butter and, to a lesser extent, cheese. The skimmed milk is returned to the farmer where it is used, with barley and other feed-stuffs, for fattening the pigs. The latter when about six months old are sent to co-operative bacon factories where modern methods of mass-production are used. Eggs are sent to co-operative grading and packing stations.

FIG. 42. THE LURMARK.

Much of this high-quality produce is exported, particularly to Britain where the Danish government's 'Lurmark', a guarantee of quality, is well known. (The Lur is an old musical instrument similar to a trumpet) (Fig. 42). However, in recent years Britain's share of this trade has declined while that of West Germany and other European countries has increased. Live cattle and meat are involved in this newer trade.

6.

Exports	%
Meat and Meat Products	26
Dairy Produce	9
Live animals	4
Furs and skins	3
Other animal and vegetable materials	14
Fish	4
Machinery	5
Electrical machinery	4
Textiles and clothing	2
Other manufactures	29

Employment	%
Agriculture	10
Industry	40
Commerce	13
Services	37

(*a*) Study the figures above and state (i) The percentage of Denmark's exports which are made up of agricultural products; (ii) the percentage of people who work on farms; (iii) the percentage engaged in industry and commerce.

(*b*) Comment on these figures in as much detail as you can bearing in mind that Denmark has no power resources and no industrial raw materials.

(*c*) Suggest what industries are based on agricultural produce.
(*d*) (i) Collect advertisements for Danish products and list these in your exercise book. (ii) Write a brief commentary on what you observe from the advertisements.

In ten years, 1957 to 1967, the percentage of the population engaged in agriculture dropped from 20 per cent. to 10 per cent. partly because farming has become more mechanised but also because modern industries have been developing rapidly. Most important is high quality engineering for the production of agricultural machinery, electrical equipment and ships. These trends are reflected in the growth of towns in which nearly 3 million of Denmark's $4\frac{1}{2}$ million people live; over one million in greater Copenhagen.

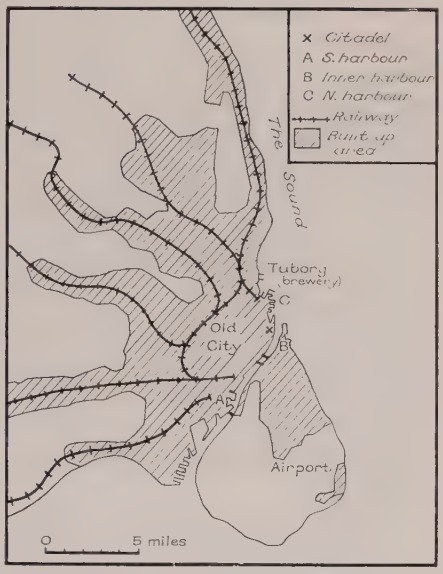


FIG. 43. COPENHAGEN.

Fig. 43 shows the site of the city which grew up to control the Sound, gateway to the Baltic. The original harbour is now the inner harbour but the port has spread to the South and North Harbours with power station and oil storage tanks to the north.

Only two other towns, Aarhus and Odense, have a population of more than 100,000. Esbjerg on the west coast, with its artificial harbour, is well known as a ferry port, trading with Britain, and as the centre of the North Sea fisheries. Plaice, rather than cod or herring, is important. Fisheries are increasing in importance with the establishment of canning and oil and meal factories.

7. Study Fig. 43.
(*a*) Describe the site of old Copenhagen in relation to its harbour.
(*b*) Suggest the reason for the citadel.

(*c*) Why are the power stations, oil storage and breweries located away from the port centre?
(*d*) Comment on the pattern of the railways.
(*e*) Comment on the site of the airport.
(*f*) In what directions has Copenhagen spread and why?
8. (*a*) What British ports have regular trade with Esbjerg?
(*b*) Why is the harbour artificial?

Sweden

The express train which leaves Copenhagen for Stockholm just before noon each day, travels for one hour along the coast of the Sound to Helsingor. Here where the channel separating Denmark and Sweden is just over 2 miles wide, a train ferry to Halsingborg is in operation. There is a similarity between Denmark and south Sweden (Skane). There is the same low-lying countryside with copses of deciduous trees amongst the well-tended fields. However, there is more grain (wheat and barley) and less pasture than in Denmark. Turnips, sugar-beet and potatoes are the main root crops and there is some glass-house cultivation. The black-and-white cattle are used for milk production and butter is an important product of the creameries. The scattered farm-houses are typically Swedish, made of timber painted dark red and with red tile roofs.

At about 15.30 the landscape changes. It is more rocky and hilly and unbroken views are difficult to obtain. There is a marked increase in heath and woodland with a predominance of birch trees and some pine and spruce. Farms occur in clearings where there is sufficient soil amongst the hard ice-moulded rocks. On the shores of the many lakes are summer holiday houses and huts for town dwellers. Cereals are less important than pasture with hay and potatoes as the chief crops. Saw mills indicate the importance of lumbering undertaken by farmers in the winter. Furniture factories are situated at the small towns for this is Sweden's main region for furniture making. It is called the South Swedish Highlands. After passing through Tranas at 17.40 the train runs into the Central Lowland country where there is more extensive farmland on the morainic soils though mixed woodland, ice-moulded rocks and lakes are still important features of the

landscape. The train stops at some of the large towns, notably Linköping where there is a Saab car factory, and Norrköping which has important textile and engineering industries, and it reaches Stockholm at 21.40.

9. Danish and Swedish town planners are discussing the possibility of one great urban area on either side of the Sound. They call it Øresundsstad and foresee a population of 2.5 million by A.D. 2000.
   (*a*) Which towns would be involved? Draw a sketch map to show them.
   (*b*) Suggest how communications could be improved.
10. (*a*) The soils of South Sweden are very similar to those of Denmark. Describe them and say how they were formed.
   (*b*) What evidence is there that the South Swedish Highlands are a glaciated upland?
11. Sweden is almost self-supporting in foodstuffs. Make a list of these and note the chief producing areas.
12. (*a*) Draw a graph to show the climate of Stockholm.

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	−3	−3	0	4	9	14	17	15	11	6	1	−2	
Rainfall ins.	1·5	1·1	1·1	1·5	1·6	1·9	2·8	3·1	2·1	2·1	1·9	1·9	22·6

   (*b*) Compare (i) January temperature; (ii) July temperature; (iii) the range of temperature with Bergen (Fig. 9).
   (*c*) Explain the differences you have noted.
   (*d*) (i) Describe the weather conditions at Stockholm shown on the weather chart (Fig. 7).

FIG. 44. A FARM SCENE IN CENTRAL SWEDEN.

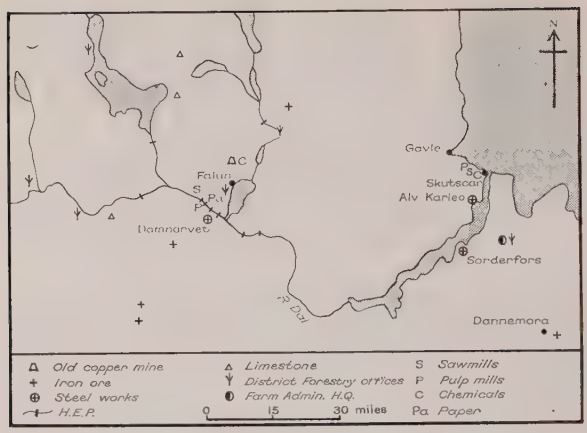


FIG. 45. DEVELOPMENTS BY THE STORA KOPPARBERG COMPANY IN THE DAL VALLEY.

(ii) Compare the temperature with the January average and attempt an explanation.

13. Fig. 44 shows a farming scene in the Central Lowlands.
(*a*) Describe the landscape noting the land use.
(*b*) Suggest why each of the two farms has many outbuildings.
(*c*) In what ways has the farmer used timber?
(*d*) (i) What evidence is there that the farm has electricity?
(ii) Suggest its origin.

14. (*a*) Draw a sketch map to illustrate the three main regions of Sweden through which the Copenhagen-Stockholm train passes.
(*b*) Add explanatory notes on the land use in the margin of your sketch.

15. Suggest why lumbering is a winter occupation.

Central Sweden is the most important industrial area of Norden, as important mineral and timber resources have long been developed by large companies. Fig. 45 shows the varied activities of one such company in the Dal Valley in the northern part of the area. Copper has been mined at Falun for 800 years and the famous mine still yields some copper ore as well as pyrites, lead and zinc. Iron ore, too, has long been mined, giving rise to iron and steel works at Damnarvet, Sweden's largest works. Charcoal from the extensive forests was first used for smelting but now imported coke is used in the blast furnaces and hydro-electric power in the steel works. When there was no further demand for charcoal, the company

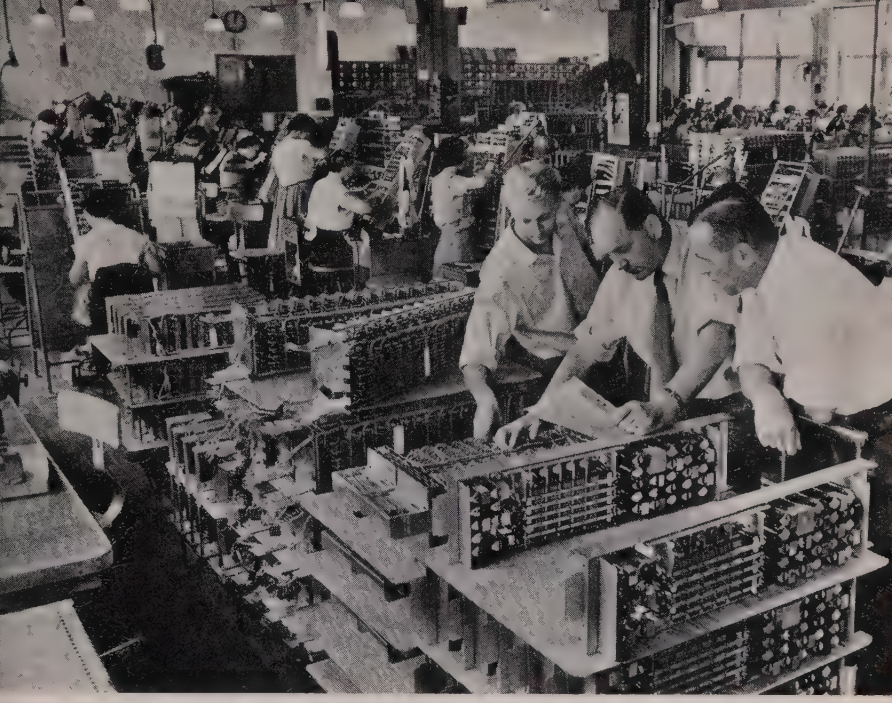


FIG. 46. A STOCKHOLM FACTORY MAKING ELECTRICAL EQUIPMENT.

developed its extensive forests and set up saw mills and pulp mills. Some of the pulp is exported but some is used in the paper works which supply one-third of Sweden's newsprint. The chemical works use pyrites from the Falun mine and many by-products of the wood pulp industry. The river is utilised fully to provide hydro-electric power for these varied industries.

Engineering industries based on high-quality steel are widespread in the towns of central Sweden particularly in Bergslagen. Stockholm makes dairy and agricultural machinery and electrical equipment (Fig. 46), while Göteborg has the S.K.F. ballbearing works, the Volvo car factory, engineering works and shipyards. Hydro-electric power from the Trollhattan falls supplies the factories of the Göteborg area.

Cargo ships and tankers are built but most modern are the 250,000 ton bulk carriers used for oil or ores. Three such carriers are seen in Fig. 47 at a shipyard opened in 1963 employing modern

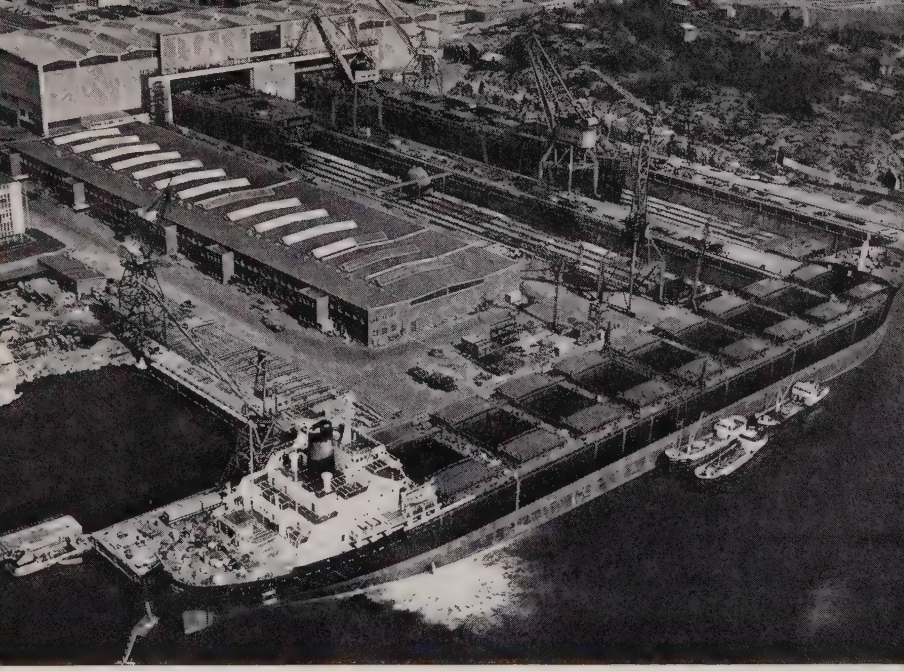


FIG. 47. A MODERN SHIPYARD AT GÖTEBORG.

assembly techniques. The huge hull assembly shed is supplied from extensive plate yards and welding shops. The hull is constructed from the stern end and fitting out goes on as it takes shape. Two bulk carriers are seen emerging into the dry docks as the work proceeds. On completion, the dry dock will be flooded to a depth of 33 feet and the lock gates will be opened to allow the ship to float out to the final fitting out berth in the foreground.

16. (*a*) Draw a diagram to show the inter-relation of industries in the Dal Valley.
    (*b*) What industries are located near the river mouth and why?
17. (*a*) Suggest reasons why Sweden manufactures high-quality steel?
    (*b*) What British steel-making centre is similar?
    (*c*) Describe the industrial scene in Fig. 46. How is it typical of Swedish industry?
18. (*a*) Draw an annotated sketch of the shipyard in Fig. 47.
    (*b*) The waterfront of the shipyard is only 980 feet long and it extends inland for 3,300 feet. Explain this.
    (*c*) Much of the work is done under cover. Why is this a special advantage in Sweden?

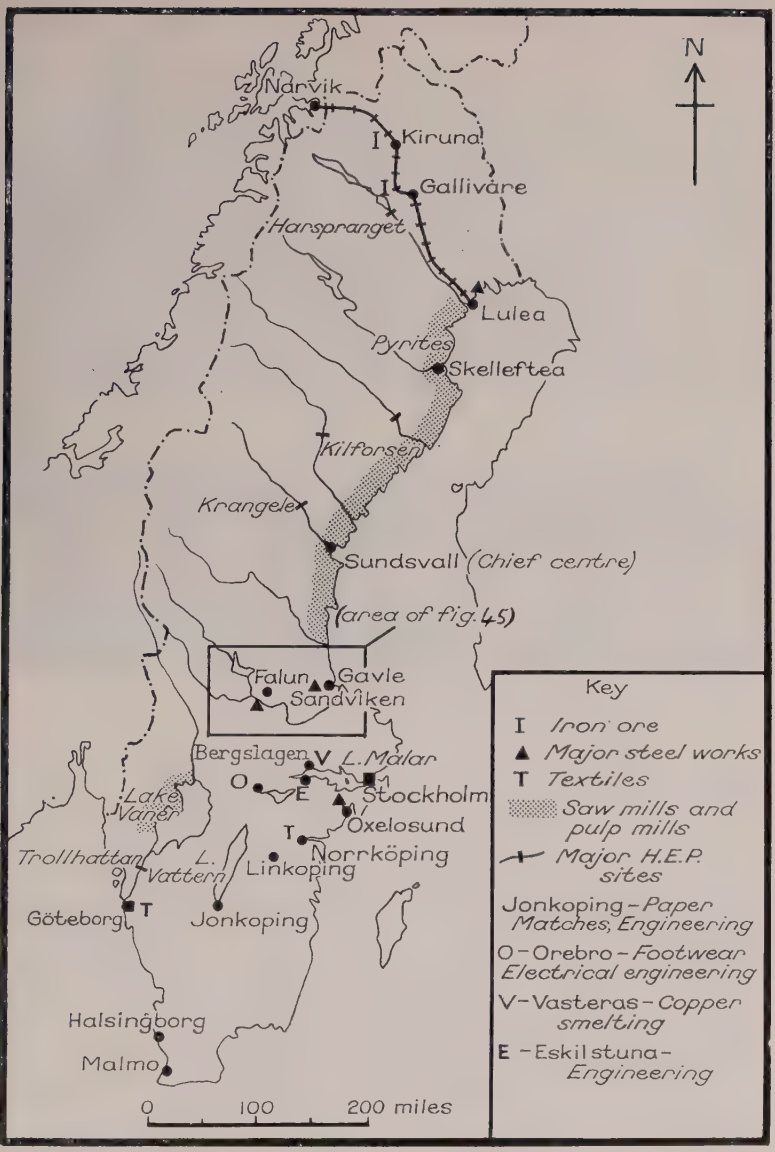


FIG. 48. INDUSTRIAL MAP OF SWEDEN.

(*d*) What raw materials used in shipbuilding are available in Sweden?

19. Using the map (Fig. 48) and the above account, list the chief industrial towns of Central Sweden and their products.

North of Gavle is Sweden's northern province, Norrland, which is more than half the total area of the country though only one-fifth of the population live there. Much of it consists of the eastern slopes of the Scandinavian mountains, from which soil has been

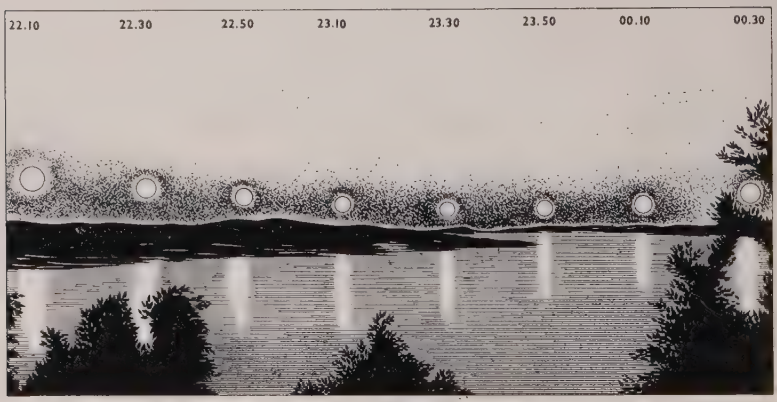


FIG. 49. THE MIDNIGHT SUN.

scraped off by the ice sheet slowly moving out from the higher mountains (Book 3, pages 194 to 196). Farming and settlement are confined to the *alluvial soils* of the sheltered river valleys. However, this century has seen the rapid development of Norrland's three great resources, timber, iron ore and electric power, all of which are available in greater abundance than in central Sweden. Extensive forests of pine and spruce are managed by great companies who practise scientific forestry with replanting keeping pace with cutting. Fig. 48 shows the many parallel rivers which flow to the Baltic coast where the saw mills and pulp mills are located. Sundsvall is the chief centre. The use of tractors and the building of roads has tended to reduce the importance of rivers recently.

The most striking development has been of the rich iron fields of Kiruna, a town of 20,000 people situated 100 miles within the

FIG. 50. KIRUNA—OPEN CAST MINING OF IRON ORE.

Arctic Circle. For six weeks in the winter the sun never appears above the horizon and the darkness and cold are difficult to endure. By contrast Fig. 49 shows the path of the sun on a typical summer day when for six weeks, the sun never sets. Fig. 50 shows part of Kiruna with the mountain where some ore is worked by open-cast methods seen across the lake. Underground mines using very modern equipment now account for 90 per cent. of the ore (Fig. 51). The ore is loaded on to railway trucks which take it to Lulea on the Baltic where there is a State iron and steel works. Some ore is sent to the central lowlands but most is exported in bulk carriers. However, for five months from mid-December to mid-May, this port is closed by ice, so a railway has been built across the mountains to the port of Narvik in Norway which is ice-free. Britain and Germany are Sweden's chief markets. Skelleftea smelts pyrites to produce copper, lead and zinc.

Ever since 1936 power from Norrland has been transmitted to the centre and south where local resources are fully developed. Fig. 48 shows some of the huge post-war schemes. Power stations are built underground for strategic reasons.

20. Describe the part played by the rivers in the development of lumbering.
21. Draw a sketch map to show the position of Sundsvall and the two large rivers which serve it.

FIG. 51. KIRUNA—A MODERN IRON ORE MINE.

22. Study the picture of Kiruna (Fig. 50).
(*a*) At what time of year was this picture taken? Give two reasons for your answer.
(*b*) Describe and account for the vegetation shown in this picture.
(*c*) What are the advantages and disadvantages of the two methods of obtaining ore?
(*d*) Draw an annotated sketch map to show the position of Kiruna and its export routes.
23. (*a*) Compare the latitude of Lulea and Narvik.
(*b*) Why is Narvik ice-free and Lulea not?
24. Using the statistics given at the beginning of this chapter, write an explanatory account of land use in Sweden.
25. (*a*) Draw a pie graph to show the sources of Sweden's energy: 35 per cent. hydro-electric power. 43 per cent. oil. 16 per cent. coal. 6 per cent. wood.
(*b*) (i) Which of these are imported and how are they used? (ii) How does the supply of energy affect the type of industry carried on?
26. Why are combined oil and ore carriers being built?

The wealthiest of the countries of Norden, Sweden supports a population of $7\frac{1}{2}$ million. Over 1 million people live in the capital,

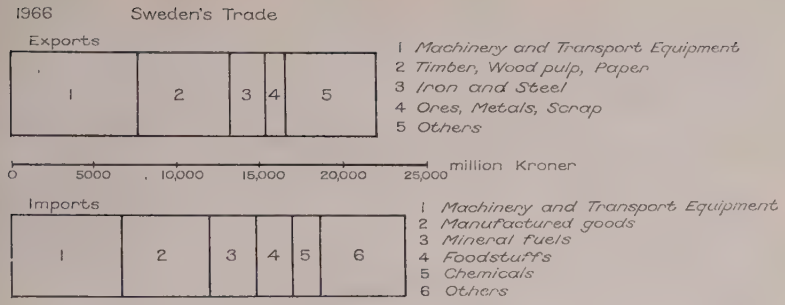
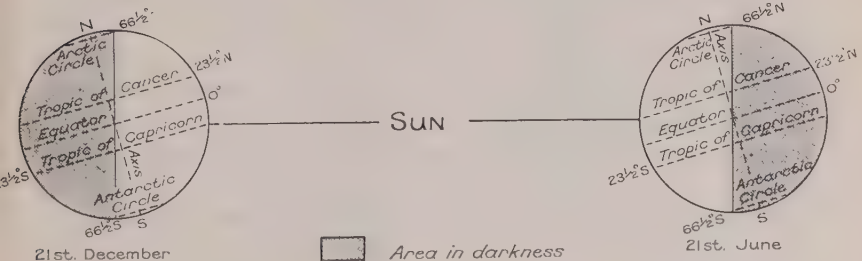


FIG. 52. SWEDEN'S TRADE, 1966.

Stockholm, which was built on a series of islands and the adjacent mainland. It is an administrative, cultural and industrial centre making a wide variety of consumer goods for home use, as well as engineering products for export. Göteborg is Sweden's chief port, equipped to handle cargoes in large containers. It is also Sweden's chief fishing port and an important industrial centre.

27. Compare the positions of Stockholm and Göteborg and suggest why the latter is more important
(*a*) as a general port; (*b*) as a fishing port.
28. Fig. 52 shows Sweden's trade in 1966
(*a*) Explain the importance of the main exports.
(*b*) Why are foodstuffs and mineral fuels important imports?
29. (*a*) With reference to Fig. 53 explain why places within the Arctic Circle have (i) long hours of darkness in winter; (ii) long hours of daylight in summer.
(*b*) With reference to Fig. 49 explain the phenomenon of the midnight sun.

FIG. 53. POSITION OF THE EARTH IN RELATION TO THE SUN ON 21ST JUNE AND 21ST DECEMBER.



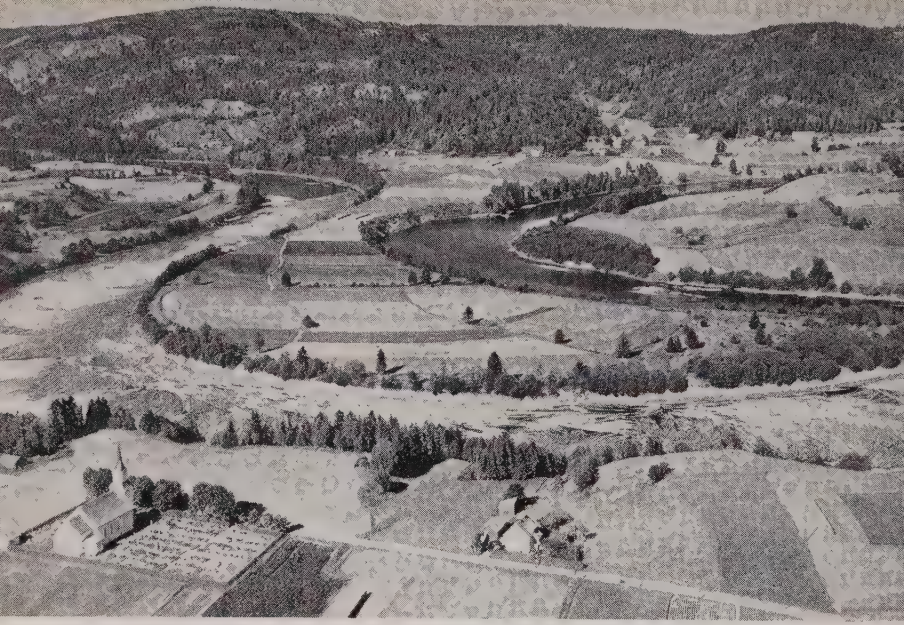
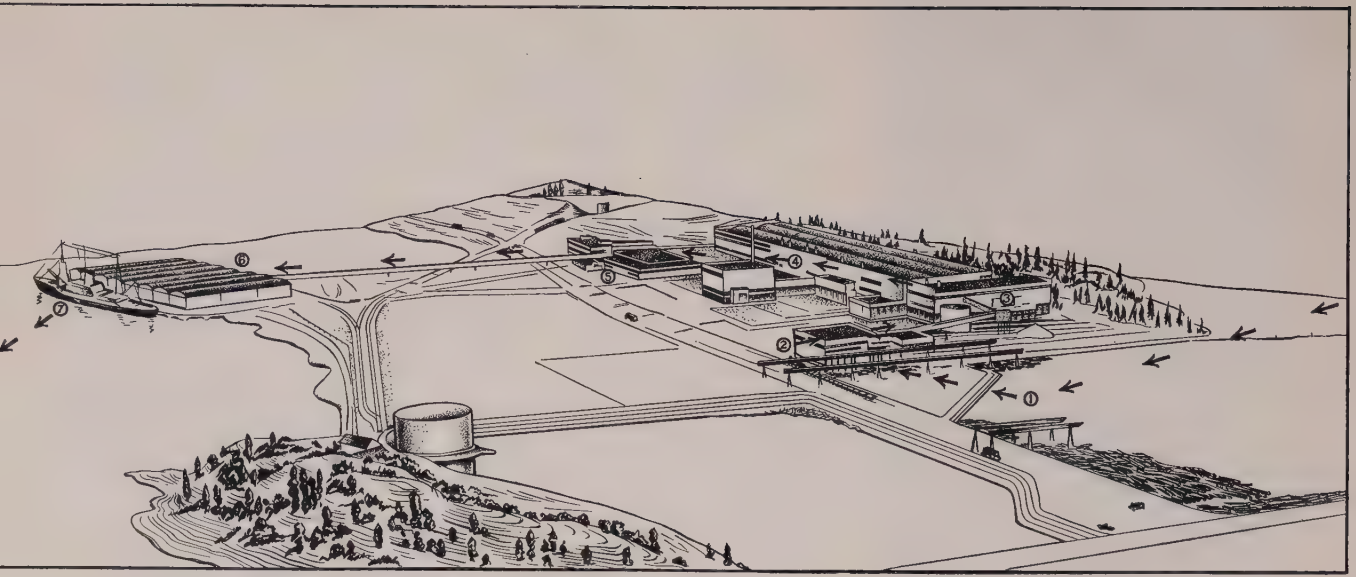


FIG. 54. EAST NORWAY TIMBER FLOATING NEAR LARVIK.

Norway

We have seen in Chapter I how the resources of the sea are vital to the Norwegian economy as only 4 per cent. of the land is farmland and nearly three-quarters of the land is classed as unproductive. In the west, the strandflat (page 2) and the lower parts of the valleys offer restricted areas for farming which the Norwegians utilise to the full especially in the neighbourhood of Trondheim and Stavanger where the lowland is more extensive. The largest lowlands, however, are found in the south-east round Oslo, an extension to the west of the central lowlands of Sweden. Fig. 54 shows a typical scene. The farmer's main income comes from his cattle which are stall fed in winter and in summer are sometimes sent to upland pastures where huts called *sæters* were built to house the people who tend the cattle and make butter and cheese. In recent years many sæters have been abandoned as modern transport enables the milk to be sent down daily. Barley, oats, potatoes and hay are grown in the lowlands with fruit growing possible in sheltered places. Norway is self-supporting in meat,



① Log Pond with timber cranes (20 acres)
② Barking Plant for logs 60" long
③ Grinders to reduce the wood to pulp
④ Paper Mill. – Long buildings to accomodate two large paper machines
⑤ Machine Shop for all mechanised maintenance
⑥ Paper Warehouse – capacity 24,000 tons
⑦ Shipping, Deep water berth (39')

The mill has its own railway connection with the inland spruce forests and is close to the European Highway (E 6)

FIG. 55. A MODERN PAPER MILL IN NORWAY.

milk, eggs and potatoes but half her needs of grain have to be imported. As in Sweden many farmers own stretches of forest and practise lumbering in the winter months. There are also some large-scale lumbering companies in the Oslo and Trondheim regions. The rivers Drammen and Glama are used for floating timber to the saw and pulp mills for which Drammen is the chief centre. Fig. 55 shows the lay-out of Norway's most modern paper mill, 50 miles north of Trondheim. These mills all depend on hydro-electric power which Norway has in abundance. Fig. 56 shows the distribution of the electro-chemical and electro-metallurgical industries which also depend on large amounts of cheap power. A new steel plant at Mo i Ranna uses local ore smelted by imported coke but electricity is used in steel production.

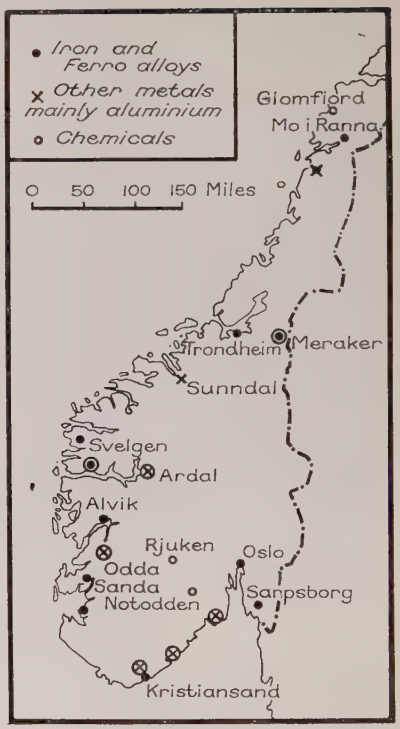


FIG. 56. INDUSTRIAL MAP OF NORWAY.

30. Draw an annotated sketch to illustrate the main geographical features in Fig. 54.
31. (*a*) Write a brief account of paper production based on Fig. 55.
(*b*) Suggest reasons for the choice of this site.
32. (*a*) Give two reasons for the abundance of hydro-electric power in Norway.
(*b*) Using Fig. 56 account for the isolation of many electro-chemical and electro-metallurgical plants.
33. 'The chief Norwegian industries are processing industries.' Make a list of these from this chapter and Chapter I.
34. The Norwegian mountains are rich in minerals such as iron, copper and pyrites. What hinders their exploitation?

FIG. 57. OSLO.

35. The hay rack is disappearing as more modern methods of hay drying are introduced. What makes this possible?
36. Norway has a well developed tourist industry.
    (*a*) Collect travel brochures and list the advantages of Norway for holidays.
    (*b*) Suggest any disadvantages.

Oslo, Norway's capital and chief port, with a population of nearly half a million, is situated at the head of Oslo Fiord in the largest lowland area (Fig. 57). Land communication with the west coast has always been difficult but rail links have been developed with Bergen and Trondheim. The 1,300-mile-long Bergen railway is a remarkable engineering feat with 200 tunnels and numerous snow-sheds to protect the line in winter. It is kept open all the year in spite of difficulties. Until recently, boats were the main and in some places the only means of transport in western Norway but the road system, with the aid of ferries, has been greatly extended and there is now a great south-to-north highway. The use of new fast boats such as the hydrofoil and hovercraft could well cause some return to the water.

37. Study Fig. 57 and write an account of what you see.
38. (*a*) Using the largest map you can find, draw a sketch profile of the Oslo-Bergen railway.
39. (*a*) Present these employment statistics in the form of a graph.

Occupation	*percentage*
Industry	26
Agriculture and forestry	18
Trading	12
Transport	11
Fishing and whaling	3

(*b*) What do they suggest about the major characteristics of Norway?

Finland

Sweden has always had close links with her neighbours across the Baltic Sea. About 10 per cent. of the people of Finland are Swedish-speaking while the rest speak Finnish, an Asiatic language. In studying Finland we find many similarities with the other countries of Norden. The following is a description of South Finland, written by an English author:

> The landscape of the south and southwest is more smiling and kindly than elsewhere in Finland. The low hills roll away gently and leafy birch-fringed lakes shimmer under brilliant summer skies or brood in autumn greyness. At times it could be an English landscape . . . but the sense of familiarity vanishes as a black and mighty pine forest comes into view, or great granite boulders splash the endless summer green with patches of red, yellow, blue and grey. This is the most densely peopled part of Finland but villages are far from each other, and the more frequent signs of human habitation are the small wooden houses set alone among the pine trees. They are discreetly low and single-storeyed, painted with red ochre and picked out with white; not far away a lake, and on its very edge, the small wooden *sauna* or bath house, with the smoke curling out of its chimney . . .
>
> The winter landscape belongs to another world—an endless world in which sea and land, forest and lake are all united by a blanket of snow whiteness which gives a similarity of look to the whole country.[1]

40. (*a*) From your atlas find (i) the distance by sea from Stockholm to Helsinki; (ii) the latitude of south Finland and note the position of this line in Sweden and Norway.
(*b*) Finland is sometimes called 'The land of a thousand lakes'. Suggest how they were formed.
(*c*) Which other part of Norden does this landscape resemble? Make a list of the features in common.

[1] Wendy Hall, *Green, Gold and Granite*, Max Parrish.

In view of Finland's high latitudinal position, it is surprising to find that 40 per cent. of the population is engaged in farming, a far higher proportion than in the other countries of Norden. Farms in forest clearings are found in all parts of the country even

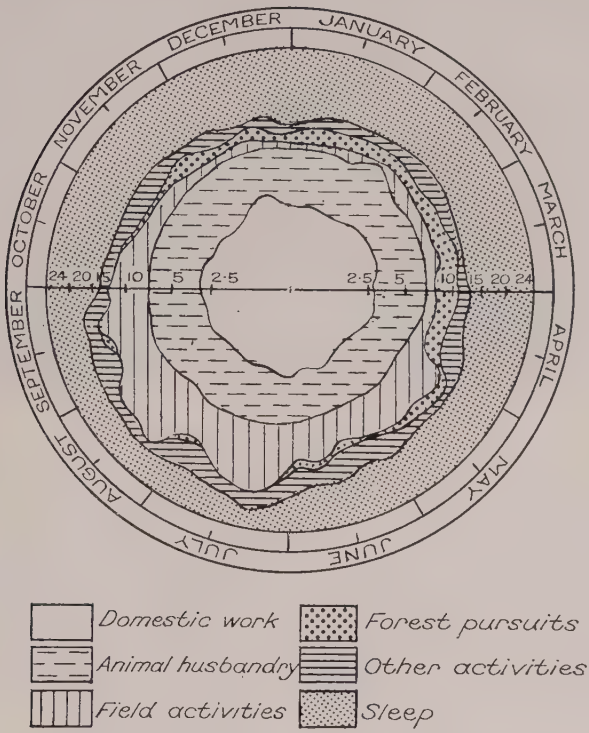


FIG. 58. FINLAND: THE FARMER'S YEAR.

within the Arctic Circle. The length of the growing season is more important than actual summer temperatures, and it varies from 175 days in the south to 120 days in the north. Frost is the greatest hazard and has led to the development of early-maturing, frost-resistant varieties of crops. It is noteworthy that the farming year does not begin until well into May, when farmers in Mediterranean lands are beginning to think of harvesting their grain.

Farms are very small, the average size being from 20 to 50 acres with 50 to 100 acres of forest. Rotation grass for hay and silage

occupies half the cultivated land while barley, rye, oats and roots are grown mainly to feed the animals. Potatoes are produced for food. Most of Finland is beyond the limit for wheat cultivation, so much is imported, especially from Russia. The farmer's chief income is derived from his cattle, pigs and poultry, as in Denmark. Butter is made in central creameries and there has been some increase in the amount of cheese made. There is some export of dairy produce.

Fig. 58 shows how a typical Finnish farmer divides his time in each month of the year.

41. (*a*) Which activities go on to the same extent all the year?
(*b*) Which activity is greatly reduced in winter and why?
(*c*) Which activity shows an increase in winter and why?
(*d*) In what months of the year do the people get least sleep and why? (Fig. 49).

Farmers depend on their forests for as much as one-third of their income and this makes possible the use of tractors for both forestry and farming. As in Norway and Sweden there has been an increase in large-scale lumbering to supply saw mills and pulp mills which provide over 80 per cent. of Finland's exports. Fig. 59 shows a large pulp mill situated to the west of the port of Kofka on the south coast where the River Kymijoki reaches the sea. As well as pulp and paper, sawn timber and pit props are exported and there has been a great increase in wood-working industries making plywood, wall-board and prefabricated houses for the export market. Hydro-electric power is used in these industries but Finland's resources are not great as the land is too low-lying.

As in the other countries of Norden, industry is increasing in importance. In addition to forest-based industries, there are important textile mills at Tampere and engineering products, ships, locomotives, power plant and electrical gear are made. Helsinki, the capital and chief port, has 600,000 of Finland's $4\frac{1}{2}$ million people. The harbour is closed only in February and March as ice-breakers are able to keep it open throughout most of the winter.

42. Study Fig. 59.
(*a*) Describe the landscape in the background.
(*b*) Account for the position of the pulp mill.

FIG. 59. A PULP MILL IN FINLAND.

(*c*) Comment on the type of building in the settlement near the mill.

43. Refer to the land-use figures at the beginning of the chapter. Can you suggest why Finland has (i) a greater proportion of forest than Sweden and (ii) a smaller amount of unproductive land?
44. Finland has about the same number of people as Denmark.
(*a*) What have the two countries in common?
(*b*) What are the main differences between them?
45. (*a*) Draw a pie graph to show the relative importance of Finland's industries according to the percentage of people employed.

Occupation	*percentage*
Metal and machinery	28
Leather, rubber, textiles, clothing	21
Wood manufacture	13
Paper and pulp	10
Food processing including dairy products	11
Others	17

(*b*) Which of these activities depend on material produced at home?
(*c*) Which of these activities depend on imported material?

The Lapps

In the far north of Norway, Sweden and Finland is the territory known as Lapland, the home of a well-known people, the Lapps, whose traditional way of life was nomadic, following the movements of herds of reindeer on which they depended for their food, clothing and shelter. Today there are about 30,000 Lapps, few of them living in the old way. Most of them now live in permanent timber dwellings and only some of the men follow the reindeer to summer pastures and live in tents. As well as breeding reindeer for sale as meat some have herds of cattle and sheep. As a whole they are quite prosperous and most have been to school. They can no longer be regarded as a primitive people.

CHAPTER IV

THE EUROPEAN COMMON MARKET

At the end of the Second World War, the countries of Western Europe, which had suffered serious damage to towns and industries as well as tremendous loss of life, were faced with the task of rebuilding. It was clear that this task would be lightened if they could co-operate, and indeed, American aid (The Marshall Plan) was given on this condition. Stage by stage six countries—France, West Germany, Italy, Belgium, the Netherlands and Luxembourg —have developed close economic relations; they are usually known as the Common Market countries or simply as 'The Six'.

The first step was taken in 1953 with the formation of the European Coal and Steel Community (E.C.S.C.) which created a common market for coal, iron ore and scrap, the raw materials of the heavy industries on which further developments would depend. Co-operation has replaced competition and we must now think of the coal and ore fields stretching from Northern France to the Ruhr in West Germany as one economic region, sometimes called the European Industrial Triangle (Fig. 61).

The idea of co-operation was further developed when in 1958 the Treaty of Rome established the European Economic Community (E.E.C.), the Common Market. All internal customs barriers have been abolished and a common policy of economic development affecting industry, agriculture, labour and transport has been adopted. A community of 170 million people, described as one of the three great economic regions of the world has been created, with political union as the ultimate goal.

Britain hopes to join this European Community but at the time of writing, this goal has not been achieved. Amongst other things, it is difficult to reconcile Britain's membership with her role in the Commonwealth. Meanwhile, Britain is a member of a looser European organisation, the European Free Trade Association (E.F.T.A.) or 'The Seven', consisting of Britain, Norway, Sweden,

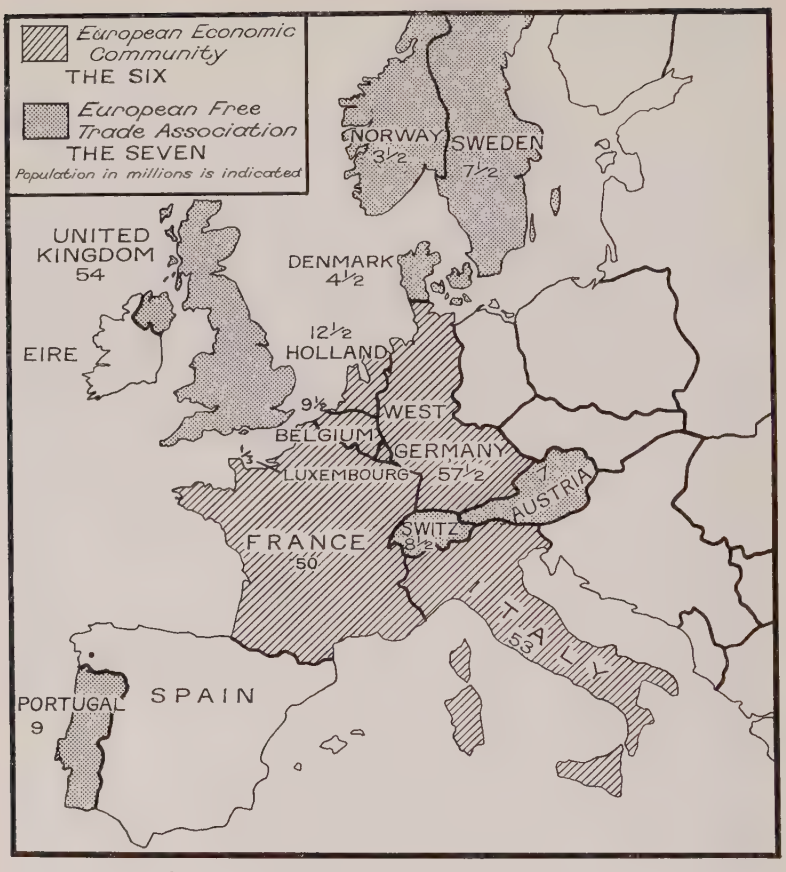


FIG. 60. COUNTRIES OF THE E.E.C. AND E.F.T.A.

Denmark, Switzerland, Austria and Portugal. It is possible that The Seven will join with The Six to make an even larger European Community.

1. Study Fig. 60 ('The Six' and 'The Seven').
   (*a*) Draw two bar graphs to illustrate the population figures.
   (*b*) Compare the total population of the 'The Six' and 'The Seven'.
   (*c*) What do you notice about the distribution of 'The Seven' when compared with 'The Six'.
   (*d*) On the above limited evidence which group seems to be the more successful and why?

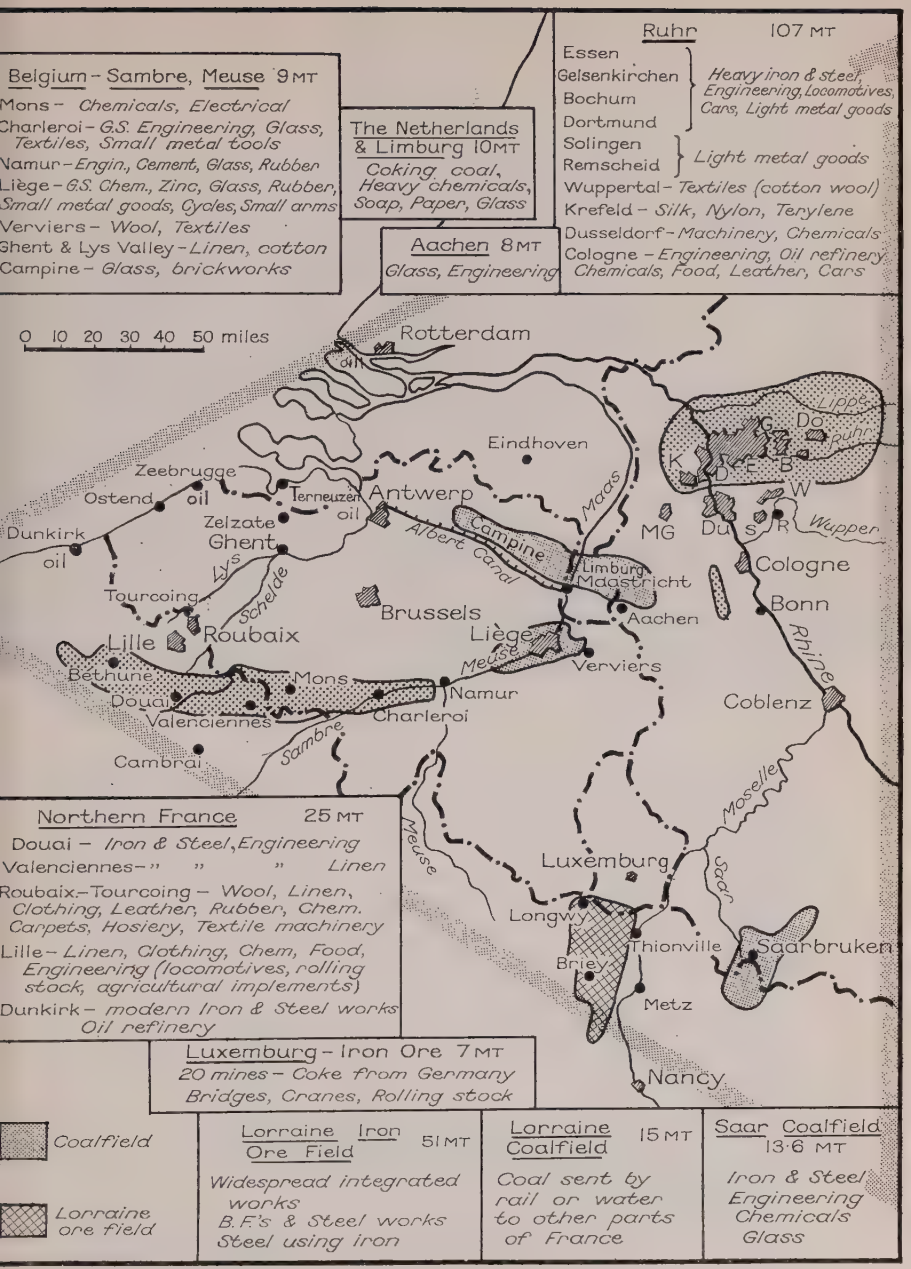


FIG. 61. THE INDUSTRIAL TRIANGLE OF WESTERN EUROPE.
MT = Million tons

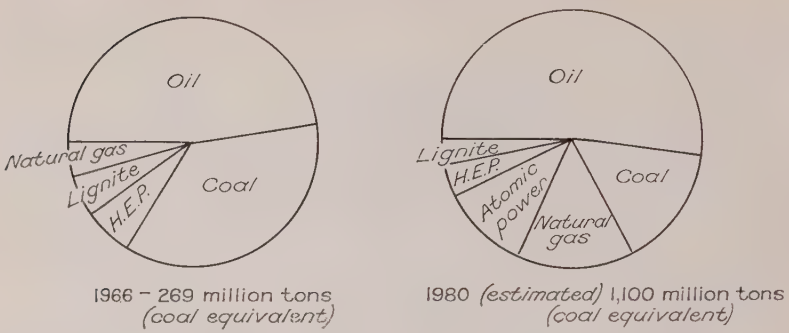


FIG. 62. CHANGING SOURCES OF POWER IN THE E.E.C.

Fig. 61 shows the distribution and relative importance of the coalfields of the European Coal and Steel Community. As in Poland and East Germany (see page 26) they lie along the margins of the mountains of Central Europe. These coalfields provided the major source of power for the industries which developed in the nineteenth and the early part of the twentieth century but they have all passed their peak of prosperity and are steadily declining as new sources of power, especially oil, become available (Fig. 62). Many of the smaller and older pits have been closed and production has been concentrated in fewer large modern pits where extensive use of modern machinery reduces the number of miners needed. Community funds are used to help unemployed miners and to establish new industries. These trends are most clearly seen in Northern France and Belgium, where the coal seams are difficult to work owing to disturbance by earth movements. Even in the great Ruhr coalfield, the largest in Europe, production is declining and the centre of activity has

FIG. 63. THE CONCEALED COALFIELD OF THE RUHR.

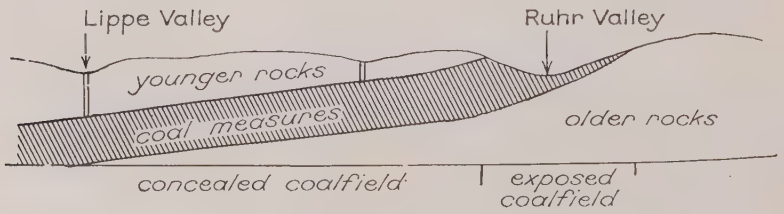


FIG. 64. A COALMINE AT GELSENKIRCHEN IN THE RUHR INDUSTRIAL REGION.

shifted north to the Lippe Valley and beyond where very deep mines pass through newer rocks to reach the coal measures below (Fig. 63). The Campine coalfield of Belgium and the Limburg coalfield of the Netherlands are similar *concealed coalfields*. Lignite, mined by open-cast methods, provides fuel for power stations in the Cologne area. Fig. 64 shows a large modern coalmine at Gelsenkirchen in the heart of the Ruhr industrial region. The industrial plant in the background is needed to convert the coal into coke for use in the iron and steel works. Much of the coal mined today is used in power stations to supply industry and homes with electricity. In recent years an increasing amount of coal has been used as a raw material in the developing chemical industries.

2. Draw a block graph to illustrate coal production in the Community.
3. (*a*) What fuel is now dominant in Western Europe?
   (*b*) Where is it obtained?

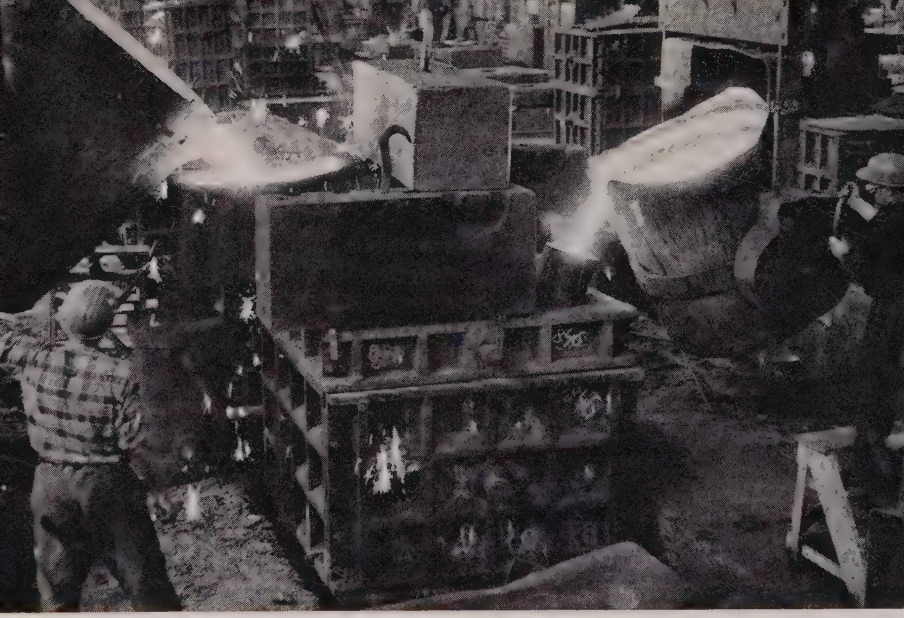


FIG. 65. THE KRUPP WORKS AT ESSEN IN THE RUHR INDUSTRIAL REGION.

(*c*) Name the chief ports of entry into the area of the Community (Fig. 61).
(*d*) What new sources of power are likely to increase in the future?

4. (*a*) What is meant by 'concealed coalfield'?
(*b*) Name the coalfields which are wholly or partly concealed.

5. Write a detailed description of the coalmine (Fig. 74).

Fig. 61 shows the Community's large iron ore field in Lorraine (France). The ores which have an iron content of about 30 per cent. are smelted in local iron and steel works. Half the coke needed comes from near-by coalfields while most of the rest is obtained from the Ruhr. Lorraine ore is also used in the iron and steel works of the French and Belgian coalfields. Nearly 40 per cent. of the iron ore needed by the Community has to be imported and this has led to the establishment of iron and steel works on the coast at Ijmuden in the Netherlands, Dunkirk in France, and at Zelzate on the Ghent-Terneuzen Canal. The iron and steel works supply the material for heavy engineering. Fig. 65 shows scenes in the Krupp works at Essen in the Ruhr. On the right, molten steel is being poured into ingot moulds which are used for

the building of locomotives, an important branch of heavy engineering.

Many other industries derive their power from the coalfields and are located on or near them. Amongst these are those making small metal goods such as are made in Sheffield or the Black Country in Britain. Old-established textile industries (wool and linen) benefited from their proximity to coalfields. They have extended their range by using imported cotton and more recently synthetic fibres produced by the chemical industry.

6. Study Fig. 61.
   (*a*) Which coalfields supply half of the coke needed in Lorraine?
   (*b*) Which country you have studied is a large supplier of imported iron ore to the Community?
   (*c*) List the towns which have iron and steel works in three columns headed—On Coalfields. On Ore Fields. On the Coast.
7. Draw a graph to show the following statistics and account for the relative importance of each country.

Steel Production in million tons—1967

Belgium	9·7
France	19·6
Germany	36·7
Italy	15·9
Luxembourg	4·4
Netherlands	3·4
	89·7

8. List the places which have the following industries indicating the coalfield on which they are situated: Heavy engineering; Chemicals; glass; small metal goods; textiles.

Water transport plays an important part in moving the heavy materials needed for industry. The Rhine is used to serve the Ruhr industrial area, Duisburg-Ruhrort being its important river port, sending coal and coke downstream and receiving iron ore and oil from Rotterdam at the mouth. The Dortmund-Ems Canal links the Ruhr with Emden, a German port. In 1964 the River Moselle was opened for navigation from Koblenz to Thionville, 170 miles away. Fig. 66 shows one of the fourteen barrages and associated locks constructed to regulate the river and produce hydro-electric power. The Sambre-Meuse in Belgium is navigable

FIG. 66. A BARRAGE AND LOCK ON THE MOSELLE.

and many industries are located along its banks. The Albert Canal links the area with Antwerp and allows the movement of Campine coking coal to Liège. The development of the Campine coalfield has been greatly assisted by this waterway as has the development of the Limburg coalfield by the Juliana Canal in the Netherlands.

9. (*a*) Using the above account draw a sketch map to show the waterways which serve the Community.
   (*b*) Put in the ports of Rotterdam, Antwerp, Ostend and Dunkirk.
10. Explain the significance of the Moselle navigation for the development of the Lorraine industrial area.

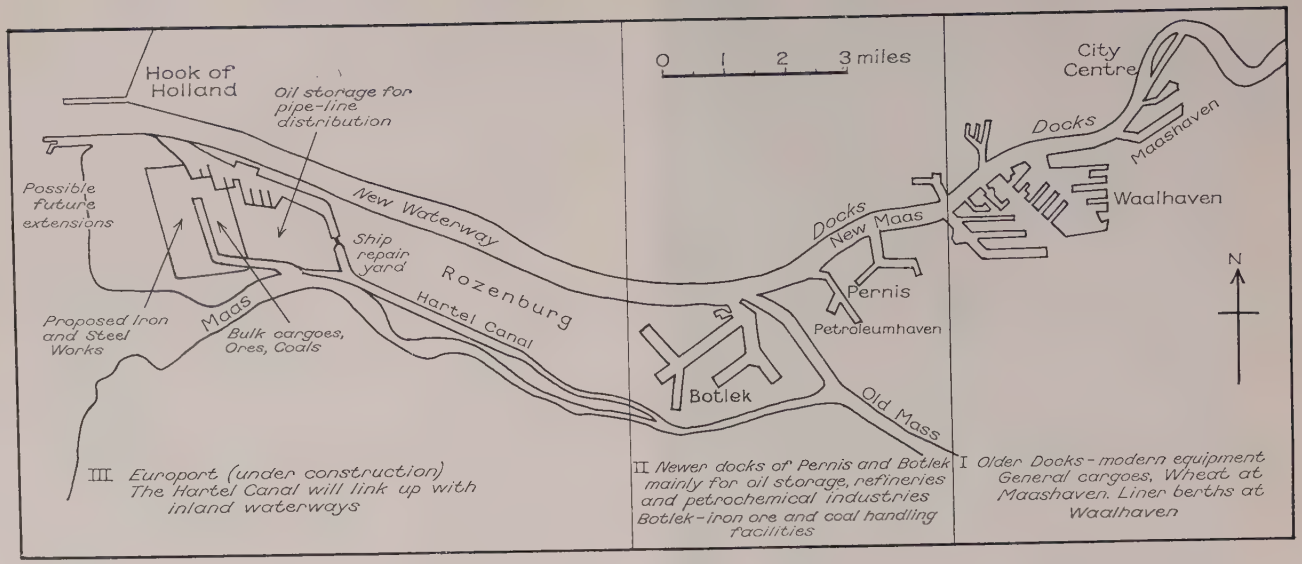


FIG. 67. THE PORT OF ROTTERDAM.

FIG. 68. OIL REFINERIES AT ROTTERDAM.

The Rhine is the natural outlet for much of the Community. However as its mouth is a *delta*, the channels frequently need dredging. The need for a port to serve the developing industrial areas was so great that it was found worth-while to cut an artificial channel (The New Waterway) linking Rotterdam to the sea. Since then the City and Port of Rotterdam, despite destruction in the Second World War, have grown so that the port has become the greatest in the world in terms of tonnage of cargo handled. Fig. 67 shows how the port has developed downstream on the drained alluvial land of the delta. Rotterdam is also the chief industrial city of the Netherlands, most industries depending on the port for raw materials (Figs. 68 and 69).

11. (*a*) Compare the mouth of the Rhine with that of the Danube.
    (*b*) Account for the difference in port development.
12. Compare the tonnage of cargo handled at Rotterdam with that of (*a*) Antwerp; (*b*) London (Fig. 70).
13. Using Fig. 67 answer the following:
    (*a*) How far is the city centre from the sea?

FIG. 69. VAN DEN BURGHS AND JURGENS MARGARINE FACTORY AT ROTTERDAM.

(*b*) Suggest why it was necessary to construct the Hartel canal?
(*c*) (i) What bulk cargoes are handled?
(ii) What is the dominant cargo and why?
(*d*) (i) Why was it necessary to build Europort?
(ii) Write a paragraph on the downstream development of Rotterdam.
(*e*) Draw annotated sketches to show the main features of Figs. 68 and 69.

Antwerp, Europe's second port, serves mainly Belgium and north-east France. Fig. 71 shows the old city dominated by the medieval cathedral, at the head of navigation on the Schelde. It is linked by tunnels to the left bank of the river where new suburbs and industrial areas have grown up. In the distance is the winding estuary of the Schelde which reaches the sea 49 miles away. As at Rotterdam there has been recent rapid downstream development of the port with associated industries (Fig. 72). Other industries are textiles, pottery, electronics and an old-established diamond cutting industry.

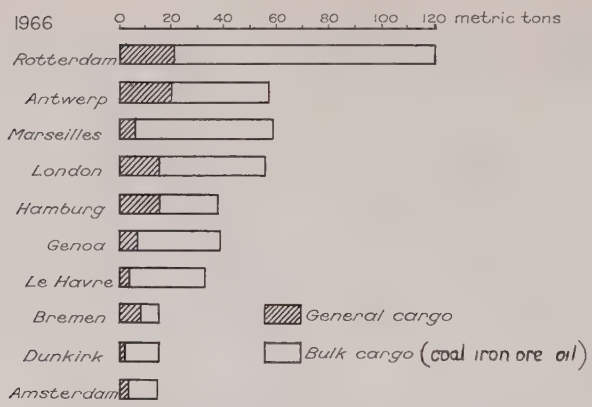
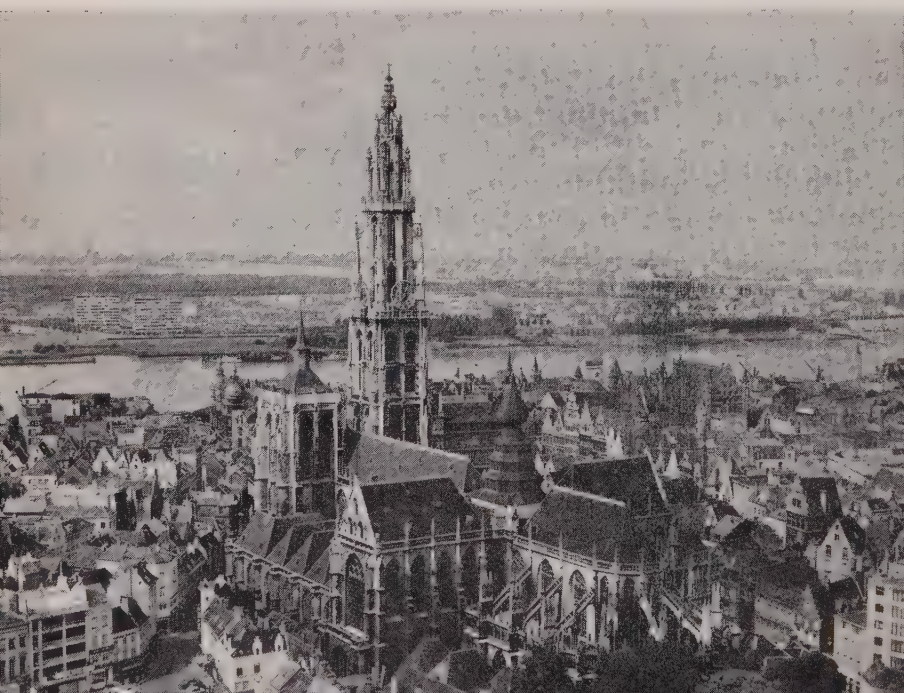


FIG. 70. TONNAGE OF CARGO AT EUROPE'S CHIEF PORTS.

FIG. 71. ANTWERP AND THE RIVER SCHELDE.



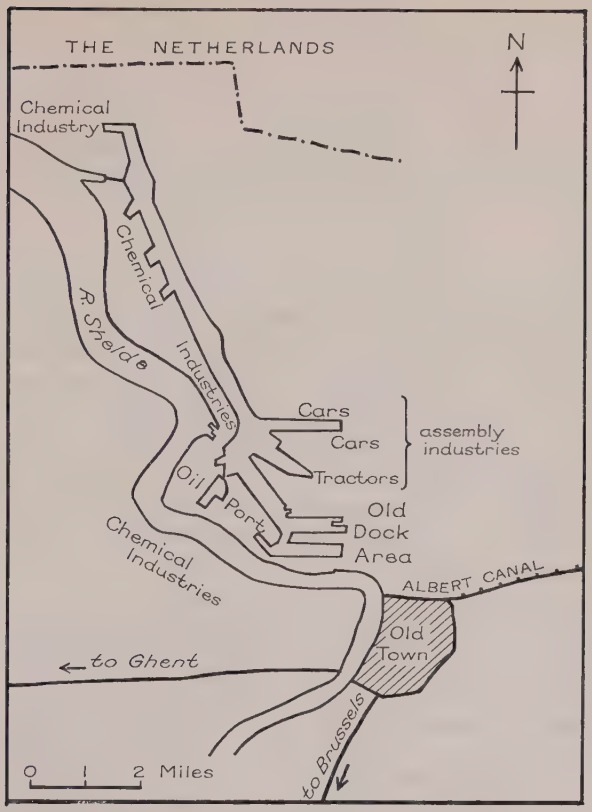


FIG. 72. THE PORT OF ANTWERP.

14. Study Figs. 70 and 71 and suggest why the right bank of the Schelde was a more suitable site for a city than the left bank.
15. (*a*) Describe the location of the chemical industries in relation to the old port.
    (*b*) Make a note of the industries shown in Fig. 72.
16. Compare Antwerp and Rotterdam in the following ways:
    (*a*) Distance from the sea.
    (*b*) Hinterland (area served by the port).
    (*c*) The relationship of general to bulk cargo.

Another rapidly growing port which serves the industrial triangle is Dunkirk, now the third port of France. Extensive oil storage facilities, refineries and a new iron and steel works have recently been built.

CHAPTER V

WEST GERMANY, THE NETHERLANDS, BELGIUM AND LUXEMBOURG

West Germany

We have already seen how Germany was divided at the end of the Second World War. The German Federal Republic (West Germany) has a population of 57½ million, over 12 million of whom are refugees from East Germany and other countries behind the 'Iron Curtain'. Many of these people who were skilled workers have contributed to the redevelopment of Germany, which has been described as 'the economic miracle'.

Fig. 73 shows the part of the North German Plain in West Germany.

1. (*a*) What is the average width of the plain: (i) from the Dutch frontier to the boundary of East Germany; and (ii) from the foot of the hills to the North Sea coast?
   (*b*) Name the three rivers which cross the plain to the North Sea and state the ports at the mouth of each.
2. The temperature and rainfall figures for Bremen are typical of the North Sea coastal areas of Europe.

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	1	2	4	8	12	15	17	16	14	9	5	2	
Rainfall ins.	1·3	1·6	1·8	1·5	2·1	2·6	3·2	2·8	2·1	2·2	2·0	2·2	25·4

   (*a*) What is the range of temperature?
   (*b*) Comment on the distribution of rainfall.
   (*c*) Name the type of climate.
   (*d*) Look again at the 0°C (32°F) isotherm in your atlas. Is the average January temperature in most of West Germany above or below freezing point?

Behind the coast are the marshlands where extensive drainage has been necessary to make farming possible. As in neighbouring Holland there has been land reclamation behind the coastal dykes. The alluvial soils are more suitable for pasture than for arable land and cattle and pigs are reared. On the drier lands fodder crops

FIG. 73. THE NORTH GERMAN PLAIN IN WEST GERMANY.

and rye predominate. Farther inland, the marshes give way to sandy heath country known as *Geest*: this is particularly extensive in the Luneburger Heide (Heath). Some of the heathland has been planted with coniferous trees but where land has been improved crops of rye, potatoes and fodder are grown to supply the stall-fed cattle and pigs. At the foot of the hills is the fertile loess belt (page 20), most extensive in the 'bays' of Munster and Cologne, which produces wheat and sugar-beet in addition to fodder crops. Market gardening is important near the large towns, especially the Ruhr industrial region.

3. (*a*) Describe the farm shown in Fig. 74.
   (*b*) Say how it differs from an English farm you know.
4. (*a*) Refer to Chapter II and explain why there is so much heathland in the North German Plain.
   (*b*) The Weser-Aller Valley is an urstromtäl. (i) How was it formed? (ii) Suggest how the land is used.
   (*c*) Why are the lands round Munster and Cologne called 'bays'?

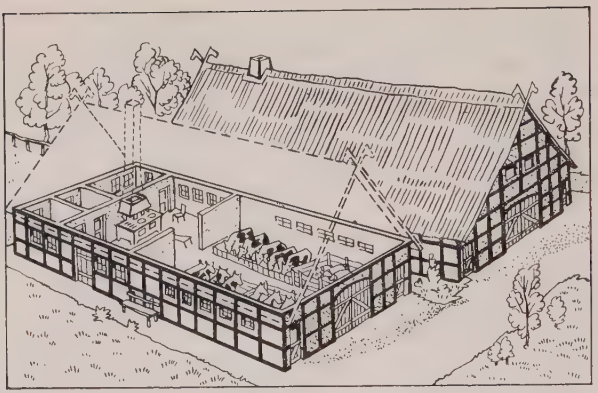
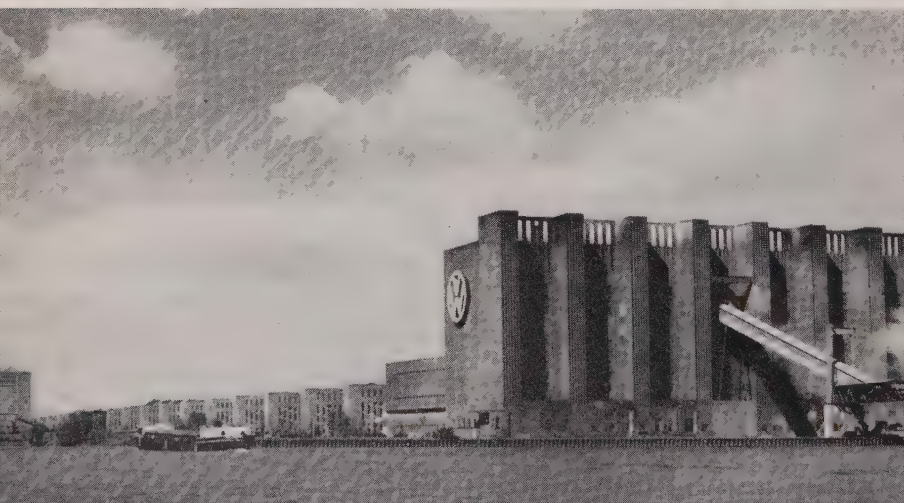


FIG. 74. A TYPICAL FARMHOUSE IN WEST GERMANY.

Most of the towns are market towns which grew up at river crossings. Many have developed industries, particularly those along the Mittelland Canal. Using a local deposit of iron ore, a new steel works has been built at Salzgitter and another at Peine near Hanover. Fig. 75 shows the well-known Volkswagen works at Wolfsburg which use much of this steel. Refugees from the east form a large part of the labour force in all these works.

5. (*a*) Why are these and many other factories built along the canal?
(*b*) Why do motor-car works need an extensive area of level land?
(*c*) Where is the nearest large supply of coal and coke?

FIG. 75. THE VOLKSWAGEN CAR FACTORY.



Industries have also developed at Germany's North Sea ports, the greatest of which is Hamburg with a population of 2 million. In addition to textiles, engineering, shipbuilding and chemicals, Hamburg has many processing industries such as flour milling, sugar refining, margarine and cigarettes. It is Germany's greatest oil port, and refineries are found along the Elbe estuary. Cuxhaven is the outport where the largest vessels berth. Bremen has long been the chief port for cotton, and the textile industry is important in the city. There is also an iron and steel works using Swedish ore and Ruhr coal. Bremerhaven is the outport and Germany's chief fishing port. Since the war the fishing fleet has been rebuilt and modern trawlers and drifters go to the North Sea and Icelandic fishing grounds. Wilhelmshaven imports oil and is linked by pipe line to Cologne (Fig. 80). Emden, smaller and of less importance, nevertheless is an important ore-importing port linked by canal to the Ruhr. Fig. 73 also shows places in the plain where oil and gas have been discovered. West Germany produces about a quarter of her needs of oil and it seems likely that natural gas will be an important fuel of the future (page 70).

6. (*a*) Draw a large sketch map to show the ports of West Germany. Add notes about the activities of each.

Fig. 76 shows divided Berlin, the pre-war capital of Germany, now isolated in East Germany. Situated on the small River Spree between the Elbe and the Oder, it is linked to both waterways. Indeed, the city was made the focal point of the waterways, roads and railways of the plain and beyond. Communication is now mainly with West Germany by the routes indicated. Five times as many goods are imported as are exported. West Berlin now has a population of over 2 million, compared with East Berlin's population of just over 1 million. In spite of the loss of all government jobs and the great influx of refugees, there is little unemployment. The pre-war electrical engineering industries continue to flourish and there has been an increase in industries which require a small amount of material in relation to skill. Food and clothing industries are also important. Only one-third of the city area is built up, 17 per cent. of the total area being forest, 6·7 per cent. parks and 20 per cent. agricultural land. The area is 325 square miles and

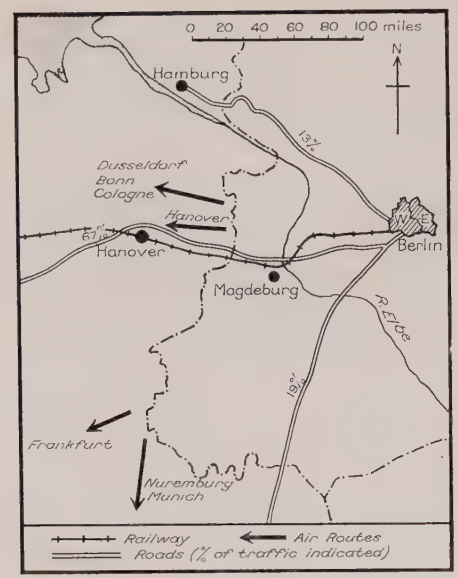


FIG. 76. BERLIN.

the city stretches 25 miles north to south and 13 east to west.

The Federal Capital of Germany is now at Bonn in the Rhineland where the Bundestag (Parliament) Building and the government offices are located.

7. (*a*) Using Fig. 76 write a brief account of Berlin's communications with West Germany.
   (*b*) Why are imports so much greater than exports?
   (*c*) Draw a diagram to illustrate land use in West Berlin.

A glance at the atlas map shows the southern part of West Germany as an upland region between 1,000 feet and 3,000 feet in height. Below this level are the many sheltered fertile valleys for the most part drained by the Rhine and its many tributaries. A small area in the north-east drains to the River Weser, while in the far south is the upper Danube basin. Fig. 77 shows the variety of hill country. The Hercynian Uplands are the roots of mountains *folded* at the end of *Carboniferous* times (Fig. 6). Worn down by erosion, they were later *uplifted*, *faulted* and *tilted*. They consist of hard old rocks, sandstones, shales, grits and crystalline rocks which form high, bleak plateau country. Between these blocks are

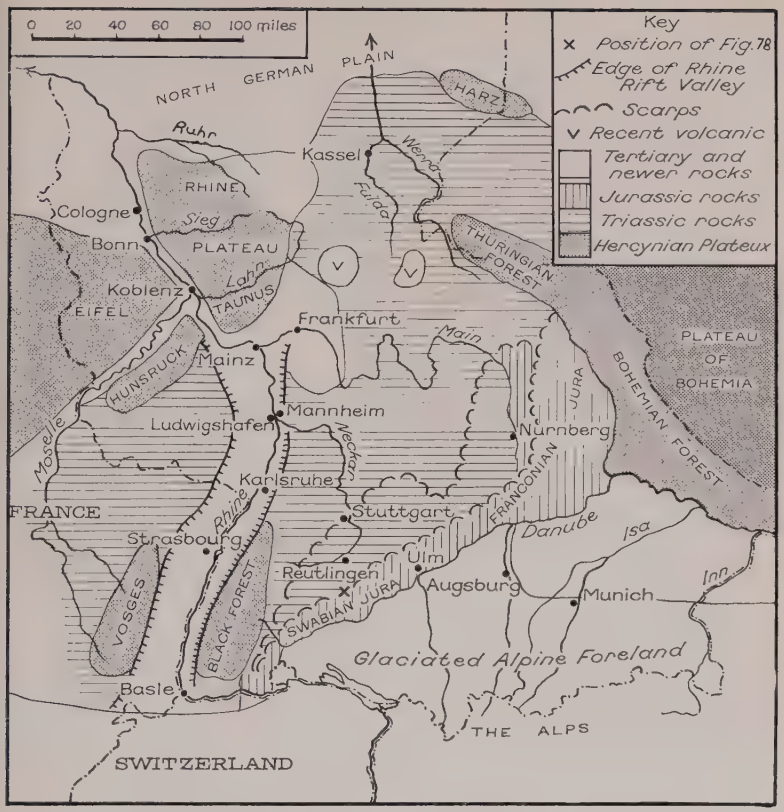


FIG. 77. SOUTH GERMANY.

younger sedimentary rocks tilted gently south-east. Amongst these, resistant rocks such as sandstones and hard limestones stand out as upland while clays and soft limestones form vales. In the far south is Alpine country (see Chapter VII). Extending north from these young folded mountains is the Alpine Foreland, a great trough filled in by tertiary rocks and covered by glacial deposits. Fig. 78 shows a typical landscape in south Germany. The village is Holzenfingen situated at about 2,000 feet in the Swabian Jura, south of Reutlingen, surrounded by its farmland in a large forest clearing. Each farmer's holding consists of a number of scattered

strips where rye, sugar-beet, potatoes and fodder crops are grown. As in most parts of Germany, cattle are stall-fed. It is generally realised that farming is less efficient than industry in Germany and farmers are being encouraged to accept compact holdings instead of strips. This is called consolidation. Many farmers whose holdings are small also work in city industries (see page 89).

8. Study Fig. 78.
   (*a*) Draw an annotated sketch to show the main features of this picture.
   (*b*) Describe and account for the distribution of woodland.
   (*c*) Compare the cultivated land with a typical stretch of English countryside.
   (*d*) Why is open grazing not practised?
   (*e*) What advantages would be gained by consolidation?

The most extensive lowland area is the Rhine *Rift Valley* which extends 200 miles from Basle to Mainz with an average width of 20 miles. This great trough was formed when the land sank between two parallel sets of faults leaving the high plateau blocks of the Vosges and Black Forest on either side (Fig. 79). The following extract from a geographer's notebook describes a journey across the Rift Valley from France to Germany.

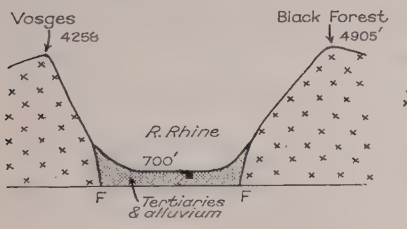


FIG. 79. THE RHINE RIFT VALLEY.

In the evening we began the descent from the Vosges following a steep winding road through thick woodland to the pleasant town of Saverne which gives its name to the col followed by rail and canal to Strasbourg. The road takes a shorter, steeper route to the valley, which we reached in the gathering dusk. Below the dark wooded escarpment of the Vosges we could see undulating and well-farmed country with hop fields that reminded us of Kent. The next morning we drove the 15 miles to the Rhine crossing beyond Stras-

FIG. 78. (*opposite*) A LANDSCAPE IN THE SWABIAN JURA.

bourg across the level floor of the Rift Valley where strips of wheat, barley, sugar-beet and lucerne made a varied pattern. More hops, orchards of apples, pears, cherries and plums and fields of tobacco gave further variety. A similar pattern was seen on the German side of the river but there was also pasture and strips of woodland on the areas where the soil was coarse gravel. Prosperous half-timbered farm-houses had tobacco leaves drying under the eaves. The morning was hazy and we had some difficulty in seeing the steep scarp of the Black Forest which seemed to rise sheer from the plain. We penetrated it along a small valley along the floor of which cultivation was continued, while on the valley sides, below the tree line, were carefully tended vineyards. As we climbed through farming villages, each with its saw mill, the valley narrowed crowding out the cultivation and the road ascended to the watershed in a series of great bends through the forest.

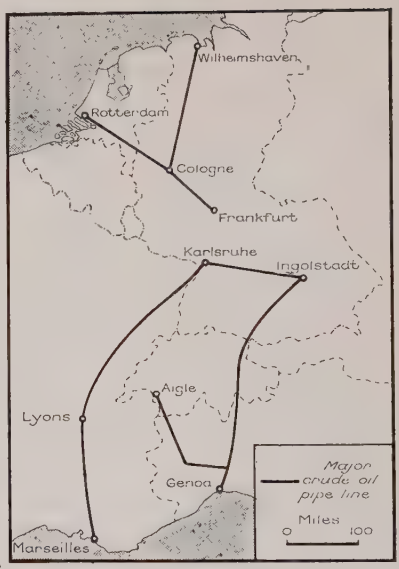


FIG. 80. CRUDE OIL PIPE-LINES IN WESTERN EUROPE.

9. (*a*) Draw an annotated sketch cross-section to illustrate the above account.
(*b*) Which of the crops mentioned are not grown in England and why?
(*c*) What has farming in the Rhine Rift Valley in common with farming in the Swabian Jura (Fig. 78)?

Cultivation similar to this is found in the sheltered valleys and basins of South Germany where there is enough level land. The summer temperature is about 2°C higher than that of Bremen. Vineyards are particularly important along the steep slopes of the Rhine Gorge between Bingen and Bonn, as well as along the slopes of its left-bank tributary, the Moselle. Fig. 65 shows vines tied to stakes.

South Germany has many great cities some of which were

State capitals before the unification of Germany in 1871. As well as being market and route centres they have many and varied industries. A great advantage is that the Rhine and its tributaries are navigable, enabling coal, oil and other raw materials to reach the industrial towns cheaply and easily. A modern canal has been constructed to link the Main and the Danube. Crude oil from the Middle East and North Africa now comes by pipe line from Mediterranean ports and Ingolstadt has become a great refining centre (Fig. 80). The oil is used not only as a source of power but as a raw material for chemical industries.

The following table shows the major industries of a number of important towns:

Town	*Industries*
Kassel	Engineering, Locomotives
Mainz	Machinery, Leather
Frankfurt	Machinery, Cars, Chemicals, Brewery, Printing, also Germany's International Airport
Mannheim	Engineering, Chemicals
Ludwigshaven	Chemicals
Karlsruhe	Chemicals, Engineering, oil refining
Stuttgart	Cars, Aircraft instruments, Textiles, Printing
Nürnberg	Toys, Electrical apparatus, Printing
Munich	Engineering, Cars, Printing, Electrical and Optical industries
Ulm	Machinery, Tools, Furniture, Cars, Electrical goods

Many of these industries are craft industries which need great skill in relation to the amount of raw material used. In this they are similar to the industries of Saxony now in East Germany (see Chapter II). Many have been stimulated by the influx of refugees notably the Zeiss factory for optical equipment which has become re-established at Oberkochon 30 miles north of Ulm.

FIG. 81. NEU GABLONZ. BAVARIA.

Fig. 81 shows Neu Gablonz, a suburb of Kaufbeuren, situated in the Alpine foreland of Bavaria. In 1946 a small group of German refugees from Gablonz in Czechoslovakia were given some empty huts and financial aid to re-establish their glass industry. Today, skilled craftsmen make artificial jewellery by hand and have built a flourishing community of 10,000 people.

10. (*a*) Draw a large sketch map to show the towns and industries listed in the table on p. 89. (*b*) From what ports does Ingolstadt receive oil? (Fig. 80).
11. (*a*) Draw a sketch map based on Fig. 81 showing the edge of the forest, the church, flats, dwelling-houses and a factory.
    (*b*) What evidence is there that the area is still being developed?
    (*c*) Compare the trees in this picture with those in Fig. 78 and suggest a reason for the difference.
12. (*a*) Draw a sketch map to show the course of the Rhine.
    (*b*) Divide it into sections (i) the Alpine section; (ii) the Rift Valley; (iii) the Gorge; and (iv) the Plain.
    (*c*) For each section summarise the geography under headings: (i) Relief; (ii) Agriculture; (iii) Industry.

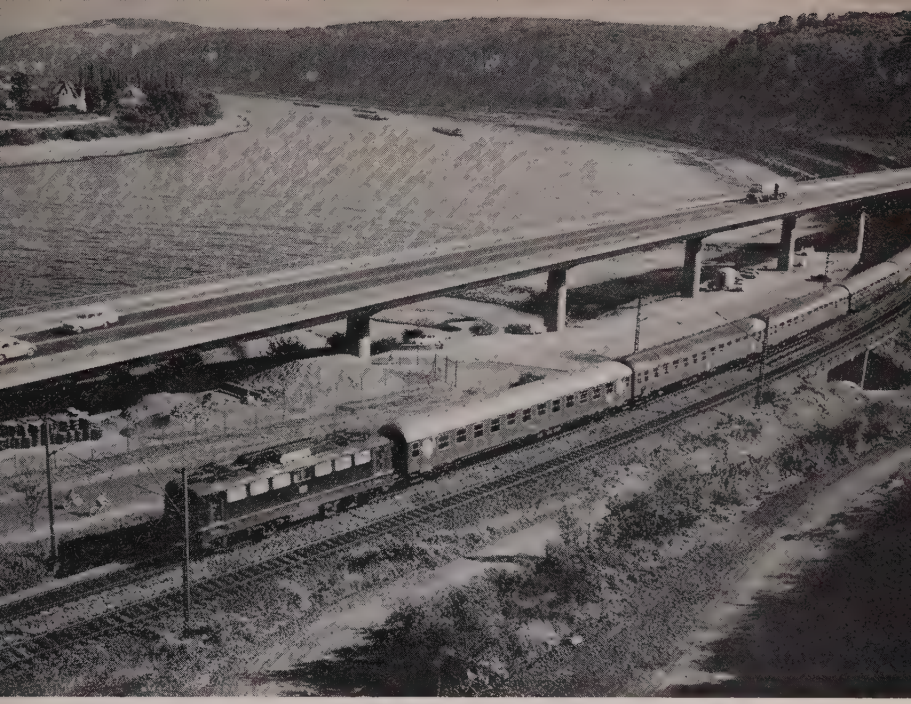


FIG. 82. THE RHINE GORGE NEAR REMAGEN.

13. Fig. 82 shows part of the Rhine Gorge near Remagen about 15 miles above Bonn. (The camera was pointing upstream.)
(*a*) Which is the left bank of the river? How does the scenery differ from that of the right?
(*b*) Where does Bonn lie in relation to this picture?
(*c*) Write a brief account headed 'The Rhine Valley as a routeway'.

The Netherlands

We have already seen that much of this country consists of the delta region of the rivers Rhine and Maas (Meuse) where the land is below sea level. The land is partially protected by a line of coastal dunes but for centuries the Dutch people have waged a battle against the sea. Setbacks and defeats have not been uncommon, as in 1953 when storms combined with high spring tides flooded most of Zeeland in the south-west, causing extensive damage and heavy loss of life.

Fig. 83 shows the country at the beginning of the seventeenth century before large-scale reclamation began.

14. Compare this with Fig. 84 and your atlas map noting the main areas where reclamation has been carried out.

Although techniques have improved and the scale of operations has become larger, the principle of *land reclamation* remains the same. The area is surrounded by a dyke of earth and stone and the water is pumped out either directly into the sea or via the rivers which flow above the level of the farmlands and settlements. The picturesque windmills gave way to steam pumps which in their turn have been replaced by diesel oil or electric pumps. The main reclamation scheme of the seventeenth century was that of the Haarlem Lake. The reclaimed lands are known as *polders*. After the reclamation of the many lakes and inlets, the draining of the Zuider Zee was undertaken. This involved the construction of a great dam 20 miles long to convert the inlet into a freshwater lake, Ijssel, and to shorten the coastline by one-third. Brushwood mattresses were sunk to prevent erosion on the sea bottom and to form a base for the clay and stone of the dam. The greatest skill was needed in the closing of the dam as the currents increased in strength as the gap narrowed. Stage by stage large new polders are being added to the cultivated land of the Netherlands. Modern methods of drainage make it possible to regulate the water table so that drought is never experienced. In Zeeland, the great delta plan is now being carried out. A series of dams is being built to connect the seaward ends of the islands and behind these extensive reclamation will take place. Some lakes will remain for water supply and pleasure purposes.

FIG. 83. THE NETHERLANDS IN THE SEVENTEENTH CENTURY.

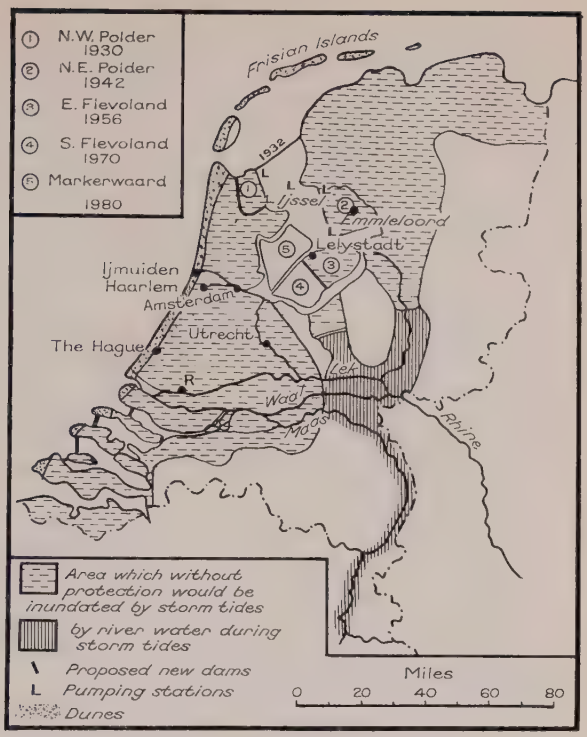


FIG. 84. MODERN LAND RECLAMATION IN THE NETHERLANDS.

15. Study Fig. 84:
(*a*) Describe the stages in the reclamation of the Zuider Zee.
(*b*) (i) Where is Amsterdam's present outlet to the sea? (ii) How has the port been affected by the Zuider Zee scheme?
(*c*) Why is the most southerly inlet of Zeeland left open?
(*d*) The effect of reclamation schemes has been to shorten the coastline. Where could the process be continued in the future?
(*e*) What proportion of the land is below sea level?

Map 1 (front endpaper) shows a piece of country between Amsterdam and the coast. There are no contour lines but heights above or below sea level are sometimes shown (in metres). The brown shading indicates the belt of sand dunes along the coast. The green patches indicate woodland and the pink, built-up areas. Waterways, roads, railways and buildings are shown in a similar way to those on a British Ordnance Survey Map.

16. (*a*) What is the representative fraction of the British 1 inch to one mile Ordnance Survey Map?
(*b*) Draw a linear scale for the same map.
(*c*) On the Dutch map, 1 cm represents 1 km. Draw a linear scale to show 8 km (5 miles). Divide this line into 5 equal parts each representing one mile.
(*d*) Is the Dutch map on a larger or smaller scale than the 1 inch to one mile British map?
(*e*) Estimate the area (in square miles) covered by the Dutch map.
17. (*a*) What is the average width of the dune belt?
(*b*) How high above sea level do some dunes reach? (i) in metres, (ii) in feet.
(*c*) What heights below sea level are shown in the drained polders?
(*d*) How does the map indicate that roads or waterways are on embankments?
18. (*a*) What do you notice about the distribution of woodland in the area? Suggest a reason.
(*b*) Contrast the drainage pattern south of the North Sea Canal with that to the north.
(*c*) Which polders are older?
19. (*a*) Account for the position of Haarlem, the chief town.
(*b*) In what three ways is Haarlem linked with Amsterdam?
(*c*) Describe the pattern of settlement in the polder lands.
20. (*a*) Draw a sketch map to show the entrance of the North Sea Canal, indicating the breakwaters, the main entrance lock, the dock areas, the town of Ijmuiden and the State iron and steel works at Velsen.
(*b*) The canal is a barrier to land communication. How does the road north from Haarlem cross it?

Fig. 85 shows how the Dutch people use the land which has been won from the sea with such great effort. Dairy farming is widespread especially on the damper land near the rivers. The typical cows are black-and-white Friesians whose milk is sent to factories to be made into butter, cheese and condensed milk for export. The large round cheeses of Alkmaar and Edam are well known. Intensive market gardening is carried on in the area of mixed soils behind the sand dunes and near Rotterdam where there is a large area of glass-house cultivation. The famous bulb-growing area is centred on Haarlem. A typical bulb farm is about 20 acres in extent with small fields separated by hedgerows as wind-breaks. The fertility of the land is maintained by constant manuring, boats often being used for transport. The spring bulbs

(daffodils, hyacinths, tulips) are planted in October and dug between June and August, while the summer bulbs (irises, gladioli, begonias, dahlias) are planted in April and May when the danger of frost is over, and dug at the end of the year. After drying on wooden trays they are packed for export to all parts of the world. Money from the sale of bulbs can buy wheat which would need 20 times the amount of land used for intensive bulb cultivation.

Fig. 86 near Alkmaar shows a typical polder landscape.

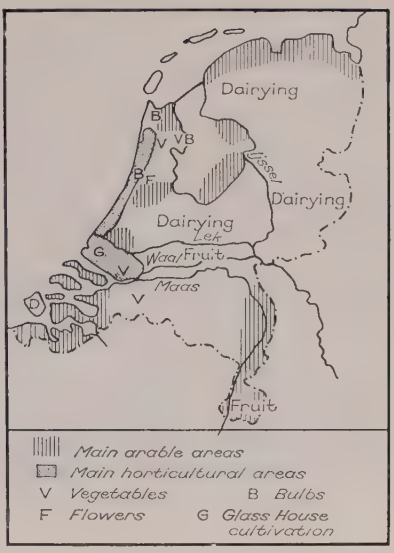


FIG. 85. THE NETHERLANDS —AGRICULTURE.

21. (*a*) Describe and account for the shape of the village.
(*b*) Where are the grass polders situated and how are they used?
(*c*) Describe the land use in the foreground.

The newly reclaimed polders of the Zuider Zee present a very different appearance, a carefully planned, geometrical landscape (Fig. 87). All the land is leased from the government and there is great competition to acquire a farm. Younger sons of farmers from other areas are frequently successful. A typical farm is an arable farm of 90 acres, growing wheat, barley, sugar-beet, potatoes and flax. No animals are kept as the land is too valuable. Mechanisation makes it possible for the farmer and one worker to run the farm with some student help at harvest time. On this polder are several villages which act as service centres, and Emmeloord, a well-planned town which serves the whole area.

In the east and south of the Netherlands the land is much less fertile and productive. It is mainly sandy-heath country similar to the Geest country of West Germany across the frontier. There is much heath and woodland but on the cleared, improved land

FIG. 86. A POLDER LANDSCAPE NEAR ALKMAAR.

FIG. 87. RECLAIMED LAND IN THE NORTH-EAST POLDER.

FIG. 88. AN OIL WELL AT SCHOONEBECK.

there is mixed farming with dairy cattle and crops such as barley, oats and potatoes.

22. (*a*) Give a detailed description of the landscape in Fig. 87.
(*b*) Suggest some advantages and disadvantages of living there.
23. (*a*) Draw a diagram to illustrate the following land-use figures:

Land use	*percentage*
Arable and market gardening	31
Pasture	38
Woodland	8
Others	23

(*b*) Where is each type of land found?
24. (*a*) Draw a diagram to show the following employment figures:

Occupation	*percentage*
Agriculture	9
Industry	42
Services	49

(*b*) In a country renowned for its agricultural products, why is the percentage of people employed in agriculture so low?
(*c*) In what other country you have studied are conditions similar?

The figures show that 42 per cent. of the Dutch people are employed in industry. The country has long-established indus-

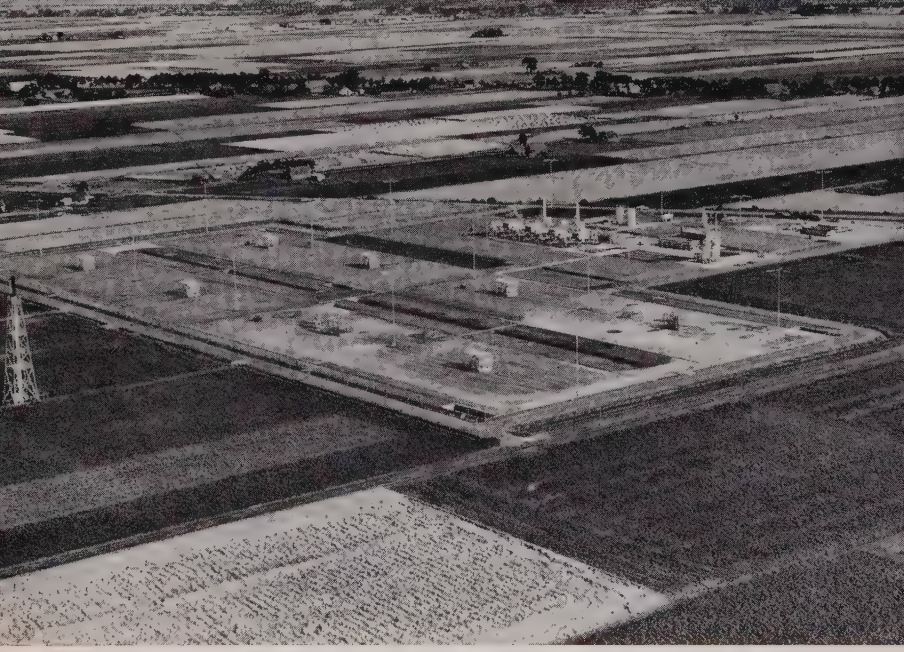


FIG. 89. THE NATURAL GAS FIELD AT SCHLOCTEREN.

tries, not concentrated on coalfields but located in the many towns throughout the country. Some power for industry is obtained from the Limburg coalfield but new and valuable sources of power have been recently discovered which promise well for the future. Fig. 88 shows an oil pump at work near Schoonebeck on the German frontier where nearly 1 million gallons are produced annually, a third of home needs of oil. Fig. 89 shows part of the famous Slochteren natural gas field in Groningen province discovered in 1959. Wells are two miles deep, tapping the gas in a bed of sandstone laid down at the end of the Palæozoic period. The derrick on the left marks the position of drilling operations, while the small cage-like structures within the enclosure are productive wells. On the right is the plant where the gas is dried and metered before entering pipelines for distribution. Television cameras mounted on poles make it possible to supervise the area from a distance. The development of this gas field will reduce the country's dependence on foreign oil imported at Rotterdam and Amsterdam.

The State Steel Works at Ijmuiden at the entrance to the North Sea Canal uses imported iron ore and coke to produce pipes and steel for tinplate and shipbuilding and the widespread Dutch engineering industries. Eindhoven has Philips's electrical engineering works.

The chief textile centres are listed below:

Wool and Linen	Old cities such as Utrecht, Tilburg, Leyden
Cotton	Hengelo, Enschede
Synthetic Fibres	Arnhem, Breda

As might be expected the greatest concentration of industry is at the ports. We have already noted the importance of the great international port of Rotterdam (page 76). Amsterdam, with a population of nearly 1 million, is more a Dutch port with a long-standing trade connection with Indonesia (formerly Dutch East Indies). Imported tropical products such as sugar, rubber, oil seeds, drugs and cocoa have given rise to processing industries, in addition to engineering, shipbuilding, chemicals, clothing, paper and diamond cutting. Amsterdam is also the commercial and cultural capital of the Netherlands, while The Hague, population 600,000 is the administrative capital and the seat of several international organisations.

The population of the Netherlands, over 12 million, is growing so fast that there is strong pressure on the limited amount of land. In Britain and France the capital cities have grown outwards from a central core and measures such as the establishment of green belts have been taken to restrict growth. In the Netherlands, growth has been from many centres creating an urban ring surrounding a green heart which the planners are seeking to preserve. The urban ring is called *Randstad.*

25. (*a*) From the above account, draw an industrial map of Holland.
(*b*) Study Figs. 88 and 89 and show how it is possible to develop oil and gas resources and still preserve the countryside.
(*c*) Draw a sketch map to illustrate the idea of 'The Green Hea
rt

Metropolis' comprised by Amsterdam, Haarlam, Leyden, The Hague, Rotterdam, Dortrecht, Utrecht, Hilversum.

26. Refer back to Chapter IV and write a brief account of Rotterdam as the chief port of the Netherlands.

Belgium and Luxembourg

Thousands of British tourists leaving Dover enter the continent of Europe via the Belgian ferry port of Ostend. Set among the sand dunes, it has an artificial harbour. Behind the dunes is the plain of Flanders, a landscape of straight lines similar to many parts of the Netherlands. Roger Pilkington sailing his small boat along the Nieuport Canal, one of the many canals which intersect the plain, described it as follows:

> For six miles we followed this pretty waterway through prosperous farming land in which all traces of two colossal wars had long since given way to golden crops, gaily decorated with the poppies and cornflowers which flowered among the wheat. Rich, thick patches of flax were interspersed with oats and sugar-beet, cabbages and barley, celery and maize. Every conceivable vegetable was growing in

FIG. 90. A FLAX FIELD IN FLANDERS.

abundance and the banks were lined with large fields each of which carried a pattern of stripes of varied crops. The fields belonged to neither full-scale farmers nor to small holdings but to establishments intermediate between the two and each field would provide for a prosperous home and a good margin for sale outside. Everywhere the Flemish peasants were at work, good humoured and tireless, and their great sandy horses pulled the harvest home to the big brick barns along the bank of the canal.[1]

27. Compare the coastline of Belgium with that of the Netherlands.
28. (*a*) What are the two main functions of the canals of Flanders?
(*b*) Make a list of (i) the arable crops and (ii) market gardening crops, in the above description.
(*c*) Describe the scene in Fig. 90.
(*d*) Explain the reference to two wars. Why did Belgium suffer badly in both?

A modern motorway runs direct from Ostend to Brussels, but the tourist often takes a slightly longer route through the ancient Flemish towns of Bruges and Ghent where the narrow streets and brick buildings with stepped gables, old churches and art collections are a great attraction. Both have modern industries, particularly textiles descended from the medieval wool and flax industries, but today cotton and synthetic fibres are more important. Bruges is linked by canal to the oil-importing port of Zeebrugge, while a modern ship-canal links Ghent with Terneuzen, the new Zelzate steel works being built along its banks. Brick works, sugar refineries and breweries are widespread in the plain. Although the land rises a little between Ghent and Brussels (250 feet) the impression is of a level, monotonous farming landscape with many settlements and busy roads. Brussels, the capital city, now has a population of over 1 million. Centrally placed, it has become the focus of the canal, road and railway network of Belgium. Carpets, lace and luxury goods are traditional industries but the capital has attracted a wide range of engineering and light industries which are now more important.

Beyond Brussels the countryside of Brabant is more undulating, with strips of woodland giving variety to the landscape. As there is a covering of fertile loess (*limon*), farming is prosperous with rich crops of wheat, barley and sugar-beet. Hops, fruit and tobacco

* R. Pilkington, *Small Boat through Belgium*, Macmillan.

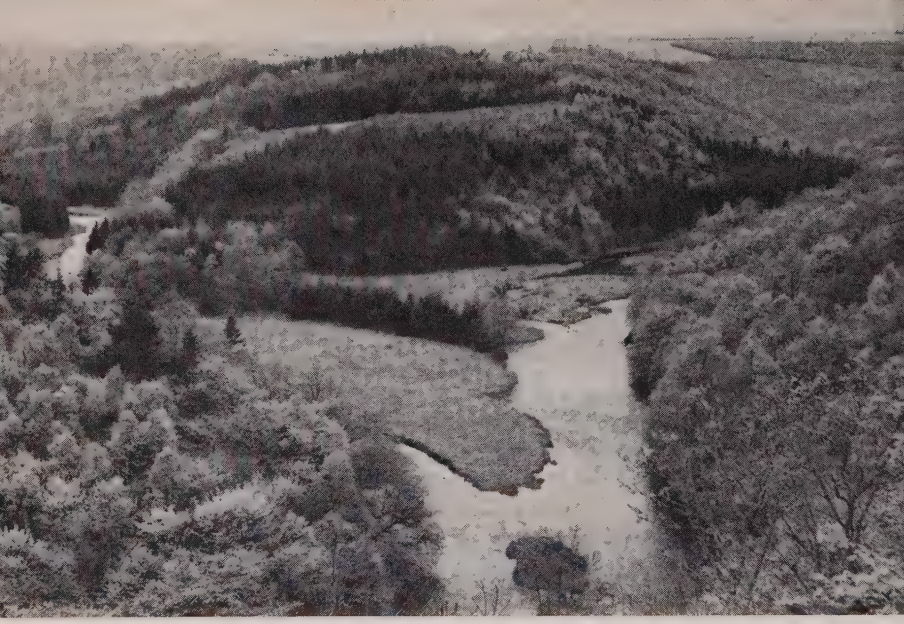


FIG. 91. A TYPICAL SCENE IN THE ARDENNES.

are locally important and cattle are stall-fed. In this area one passes from the Flemish-speaking area of North Belgium to the Walloon (French)-speaking area of the south. There is great rivalry between these two elements of the Belgian population.

The Sambre-Meuse Valley is crossed at Namur, an old fortress town at the confluence of the two rivers. This part of the valley is less industrialised than the Charleroi and Liège areas (see Fig. 61). The Meuse can be followed upstream to penetrate the Ardennes. The valleys of the rivers are cut deeply into the plateau surface and the sides are thickly wooded (Fig. 91). On the level plateau surface there is woodland and cultivation with rye, potatoes and fodder as the chief crops. This attractive countryside is in strong contrast to the densely peopled plains and is used as a playground for people from other parts.

Luxembourg is very similar to South Belgium and the traveller is hardly aware of the change to another country, particularly as there are no customs barriers. Luxembourg city has a striking position on the slopes of a steep valley. The south-east of the country is similar to Lorraine, which it adjoins, with vineyards

on favourable slopes and iron ore deposits which have given rise to an iron and steel industry. A journey across Belgium and Luxembourg to the French frontier enables a traveller to see the characteristic landscapes of Belgium except the Campine, which is sandy heath country similar to the Geest of Holland and Germany of which it is a natural continuation. Belgium's chief port Antwerp lies in this area (see page 77).

29. The geography of much of Belgium can be summarised on a transect diagram (Fig. 92). Copy this into your book and complete it, referring to the information given.

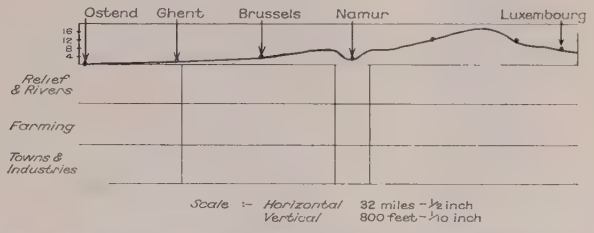


FIG. 92. BELGIUM. A TRANSECT DIAGRAM.

30. What other regions of Germany have a natural continuation in Belgium?
31. (*a*) Draw a diagram to show land-use figures.
(*b*) Compare the figures with those for the Netherlands.

Land Use	*Percentage*
Arable and market gardening	31
Pasture	25
Woodland	20
Other uses	24

32. Using Fig. 60 and your atlas, draw a large sketch map to show the main industrial region along the Sambre-Meuse valley.
33. Refer to Chapter IV and write a paragraph on Antwerp as the chief port of Belgium.
34. (*a*) Draw two columns labelled Belgium and The Netherlands.
(*b*) In them summarise the geography of the two countries under the headings (i) Relief, (ii) Agriculture, (iii) Mineral wealth, (iv) Industries.
35. (*a*) What mountain building movement has been described in this chapter.
(*b*) At what period of geological time did this take place?
(*c*) Compare this with the two earth movements mentioned in Chapter I.
(*d*) From your atlas make a list of the Hercynian blocks that you have studied so far.

CHAPTER VI

FRANCE

1. Study Figs. 93 and 94 with your atlas and answer the following:
   (*a*) Which parts of Western Europe are very densely populated?
   (*b*) Which parts of France are very densely populated?
   (*c*) Which country has the greatest area of thinly populated land?
   (*d*) Compare the density of population in France with that of West Germany.

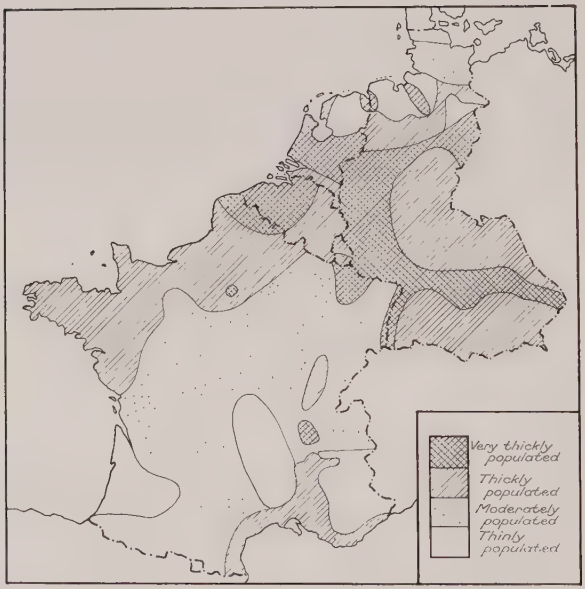


FIG. 93. THE DISTRIBUTION OF POPULATION IN WESTERN EUROPE.

2. (*a*) (i) What do you notice about the relative importance of imports and exports of foodstuffs? (ii) What does this suggest about the importance of agriculture in France?
   (*b*) Refer to Figs. 61 and 80 and account for the large import of oil.
   (*c*) Suggest why manufactured goods are dominant in both import and export trade.

YOUR answers to these questions tell you quite a lot about France. In addition it is important to note that it is the largest country in

Europe, more than twice as large as West Germany or Great Britain but with a population (50 million) slightly smaller than theirs.

Fig. 95 shows the Paris Basin, the most important region of France, dominated, as its name suggests, by the capital city. Much of it is low plateau with an average height of 500 feet, into which the Seine and other rivers have cut deep valleys. The soils of the basin are very varied, some being derived from the underlying

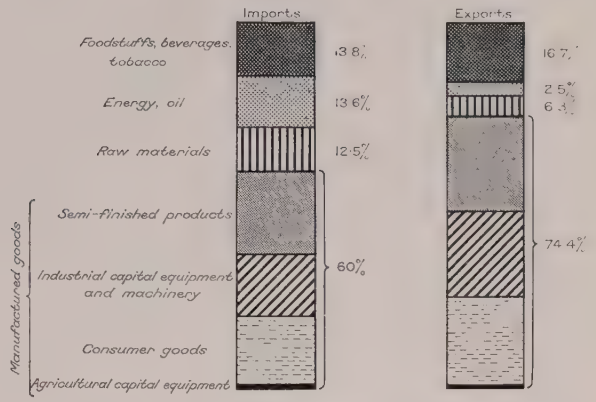


FIG. 94. FRANCE. FOREIGN TRADE.

rocks, but in the centre and west these are often masked by deposits of wind-blown loess, called *limon* in France, while along the valleys are broad stretches of *alluvium*. This is one of the richest agricultural regions in Europe, producing over 40 per cent. of France's wheat and 60 per cent. of her sugar-beet. Fig. 96 shows a typical farming landscape. Nearly 20 per cent. of the region is forested but between are the vast open fields unbroken by hedgerows. The field pattern of wheat, sugar-beet, lucerne, clover and potatoes is repeated as far as the eye can see. In recent years the size of the farms and fields has been increasing, making possible the use of tractors, combine harvesters and other machinery. Pasture is found on the clay and alluvial soils, where cattle can be seen grazing, but elsewhere they are stall-fed. A high proportion of the milk is used for cheese making, French cheeses being familiar in British shops. Market gardening is locally important especially in the valleys of the Somme, Marne and Loire, while

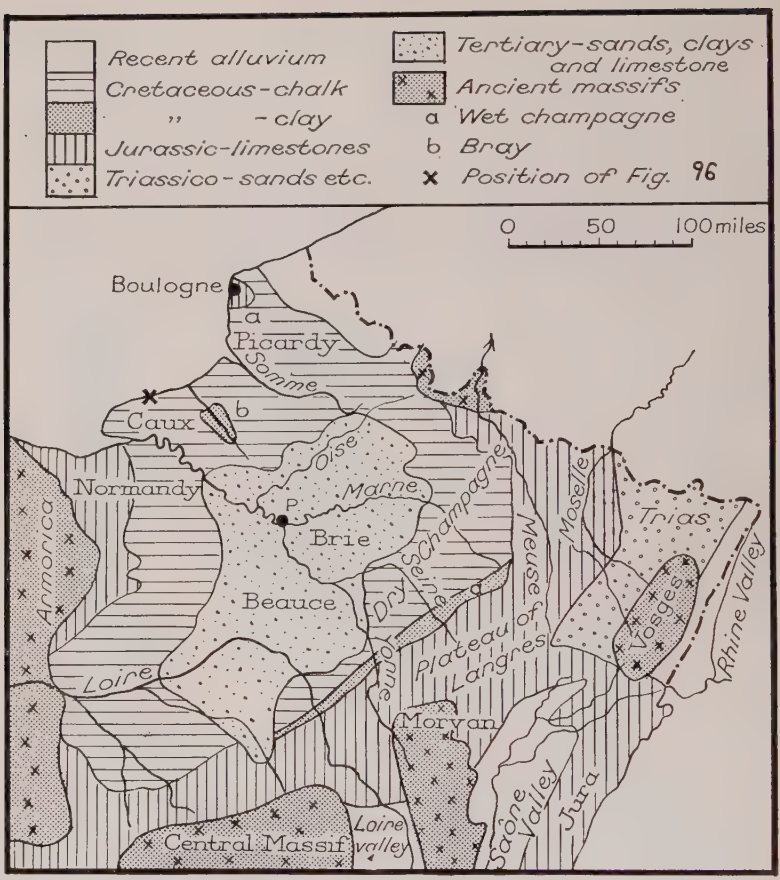


FIG. 95. THE PARIS BASIN.

on the south-facing slopes near Rheims are the famous champagne vineyards.

3. (*a*) Describe the position of Paris in relation to the rivers of the Paris Basin.
   (*b*) (i) Name some of the districts where clays predominate and suggest how the land is used. (ii) What is the underlying rock shown in Fig. 96? (iii) Name some other areas where it outcrops.
4. (*a*) Why are lucerne and clover grown widely in the Paris Basin?
   (*b*) Why is market gardening important in some areas?
   (*c*) (i) Make a list of popular French cheeses. (ii) Which of these are produced in the Paris Basin?

FIG. 96. A COASTAL LANDSCAPE IN THE PARIS BASIN.

PARIS

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	3	4	7	10	14	17	19	18	15	11	6	3	
Rainfall ins.	1·5	1·3	1·5	1·7	2·0	2·1	2·1	2·0	2·0	2·2	2·0	1·9	22·3

5. (*a*) Draw a temperature and rainfall graph for Paris.
   (*b*) How does this climate favour the growth of wheat?

In the heart of this rich agricultural region is the great capital city of Paris with a population of over 8 million. Fig. 97 shows Ile de la Cité the site of the original settlement some 2,000 years ago. The camera is pointing upstream and the famous cathedral of Notre Dame is clearly visible. Fig. 98 shows the old city of Paris with population of $2\frac{3}{4}$ million extending to the boulevard which marks the 1847 fortifications. The present built-up area is indicated and the plan for the future development of the city along two major axes.

FIG. 97. ILE DE LA CITE.

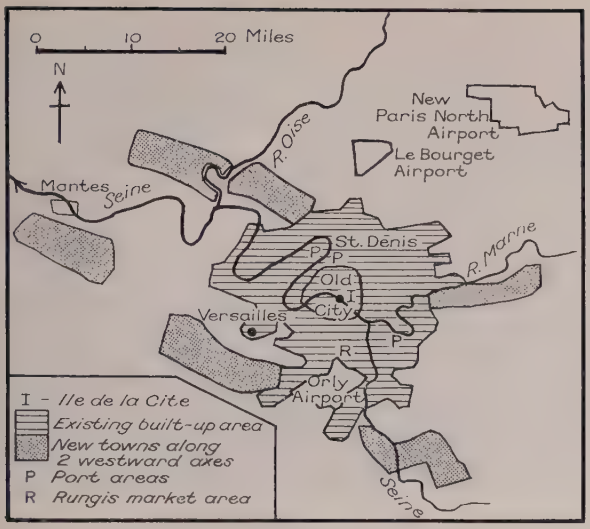


FIG. 98. PARIS—PAST, PRESENT AND FUTURE.

Paris has all the functions of a great capital city; it is the centre of government, the seat of an ancient university, and a centre for law, commerce, industry, transport and recreation. Over half the people are employed in service occupations but some 45 per cent. are employed in a great variety of industries. The old city is the centre of the luxury goods and fashion industry for which Paris is world famous, jewellery, furniture, metal goods and clothing being made in small establishments. Larger-scale industries in the suburbs include light engineering, the making of electrical goods, pottery, glass, paper and printing, leather and prepared foods. The heavier industries are located in the north-west, the St Denis area, where there is good rail and river transport. Heavy engineering, including the making of railway material and heating equipment, and heavy chemicals are carried on here, while the vehicle and aircraft industries occupy extensive riverside sites. The lower Oise and lower Marne areas, too, are centres of heavy industry.

Paris is the focal point of France's transport system. It is a great road and rail centre as well as France's chief inland port. Heavy goods such as coal, oil, timber, building materials are brought by barge to the quays both above and below the city. Paris is linked to the industrial regions by river and canal (Fig.

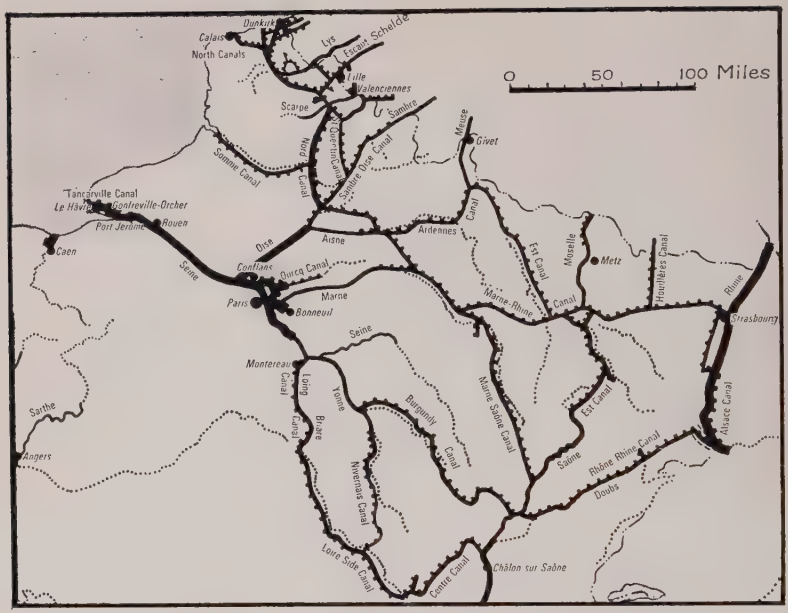


FIG. 99. THE WATERWAYS OF NORTH-EAST FRANCE.

99). Pipe lines bring both crude and refined oil from Le Havre and gas from Lacq and the Netherlands.

6. (*a*) Estimate the distance from Ile de la Cité to the northern and southern edges of the Old City.
   (*b*) Suggest why the original settlement was on an island.
   (*c*) Estimate the size of the built-up area from north to south and from east to west.
   (*d*) How far is (i) Orly Airport? (ii) The new airport from the city centre?
7. (*a*) Suggest reasons for the location of the port areas of Paris.
   (*b*) Why is heavy industry found along the Oise and the Marne?
   (*c*) Suggest the routes used by the barges in Fig. 100.

Paris is so dominant that it has overshadowed other towns, few of which attain a population of 100,000. However, developing industries are being encouraged to seek sites outside the Paris area and a new lease of life is being given to some of the old towns which usually developed as market centres at river crossings.

FIG. 100. DUTCH AND BELGIAN BARGES MOORED IN THE SEINE. ILE DE LA CITE IS ON THE LEFT.

Many had long-established textile industries to which have been added expanding mechanical and electrical engineering and chemical industries. Cars and agricultural machinery are typical products. Some such towns are Amiens, St Quentin, Rheims, Troyes and Orleans.

Rouen, with a population of 365,000, is the second town in the Paris Basin. It grew up at the head of navigation on the Seine where ocean-going ships transferred their cargoes to river boats to complete the journey to Paris. In spite of its inland situation, it remains the fourth port of France, importing coal, oil, wine and refrigerated goods and exporting the products of French industry, particularly from the Paris region. An old city, it has many industries, such as cotton textiles, paper and engineering. A modern development is an extensive area of oil refineries on the banks of the Seine below the town fed by pipeline from Le Havre. Petrochemical industries making plastics, synthetic fibres and rubber have been established.

Le Havre, at the mouth of the Seine on its northern bank, is now France's second port: it accommodates the largest ocean-

going vessels and is particularly important as a passenger port. Tropical timber, ores, fertilisers, cotton, rubber and fruit are imported but oil now accounts for 87 per cent. of the imports. Industries include smelting of metals, chemicals, timber and cars as well as a naval dockyard. A new oil-fired power station is the largest in Europe. The building of a huge modern bridge across the Seine 20 miles upstream has had the effect of extending Le Havre's hinterland to areas on the southern side of the Seine. Dieppe, Boulogne and Calais are ferry ports trading with Britain. Boulogne is the chief fishing port of France (page 128).

8. Draw a sketch map to show the position of the towns in the above account.
9. (*a*) (i) Suggest why Le Havre has become a more important port than Rouen. (ii) Why is this trend likely to continue?
   (*b*) Both ports export the products of Paris industries. Suggest some of the goods exported.

Northern and Eastern France

Between the edge of the Paris Basin and the frontiers of France are the industrial regions described in Chapter IV. The rural landscape of northern France is similar to adjacent parts of Belgium of which it is a natural continuation. Fig. 99 shows how the waterways cross the frontier. Farther south, the Marne-Rhine Canal connects Paris with Strasbourg, the second river port of France. Beyond the Paris Basin it passes through Lorraine and Alsace just south of the main industrial region. Construction of this canal was difficult as Lorraine is made up of many parallel ridges of sandstone or limestone separated by clay vales drained to the north by the rivers Meuse and Moselle. The steep slopes of the ridges are wooded but cultivation, similar to that of the Paris Basin is widespread elsewhere. Alsace is made up of the Vosges Mountains, a Hercynian block which rises to 4,679 feet, surrounded by areas of younger sandstone, as well as the western part of the Rhine Rift Valley (see page 87). The High Vosges consist of summer pastures and forests but in the sheltered valleys farming is practised with cereals, vegetables, orchards and vineyards. Many small market-towns have old-established textile industries, while woodworking, paper, glass and pottery are locally

important. In the Rift Valley, Mulhouse and Colmar are important centres with textile and heavy engineering industries. Strasbourg, with a population of 200,000, is the chief town of eastern France, situated on the River Ill which flows parallel to the Rhine through the Plain of Alsace. Its river port on the Rhine receives coal and oil and sends out potash and heavy engineering goods. Industries include, heavy engineering, tanning, paper and printing and food processing. In recent years the Rhine between the Swiss frontier and Strasbourg has been regulated by a series of eight barrages. Navigation has thus been improved and hydro-electric power made available. Another new development has been the construction of an oil refinery on the Rhine fed by the pipeline from the Mediterranean (Fig. 80).

10. (*a*) What is the distance by waterway from Paris to (i) Strasbourg; (ii) Dunkirk?
(*b*) Name the canal which follows the Meuse Valley in Lorraine.
11. (*a*) Refer to Chapter V and write a note on the agriculture of (i) the Rhine Rift Valley; (ii) Flanders.
(*b*) Refer to the account of agriculture in the Paris Basin and suggest the use of the land in (i) the limestone areas; (ii) the clay vales of eastern France.
(*c*) Why is Lorraine a major industrial region?
12. Draw a sketch map to illustrate the main geographical features of Alsace and Lorraine.

The Rhône-Saône Valley and Adjacent Areas

The improvement of the navigation of the Rhine is part of a greater scheme, to link the North Sea and the Mediterranean by a modern navigable waterway along what is sometimes called 'the economic axis of Europe'. Fig. 99 shows that the Rhine and Rhône tributaries are already linked by canal which passes through the Belfort gap, but a deeper canal is planned. The Belfort gap is a historic routeway followed by rail and road also. The main rail and road routes from Paris to the Mediterranean reach the Saône Valley lowlands at the important market, industrial and route centre of Dijon. The routes along the Saône Valley from Dijon to Lyons keep close to the western edge of the valley where the slopes are clad in vineyards which produce the famous Burgundy wines. East of the Saône is an extensive

lowland where wheat, maize, barley and fodder crops are grown. A large proportion of the crops is fed to animals so that the farmers' income is mainly from milk products, especially cheese, and to some extent from the sale of pigs and chickens. Market gardening is locally important especially near Chalon-sur-Saône. To the east of the Saône lowland rise the parallel wooded ridges of the Jura Mountains shared by France and Switzerland (Chapter VII). Dairy farming and watch-making are the chief occupations in the valleys. The main railway from Dijon to Switzerland and the Alpine passes crosses the region.

13. (*a*) Draw a sketch map to show the position of Belfort and Dijon as route centres.
(*b*) Draw a sketch transect diagram across the Saône Valley from the Côte d'Or to the Jura showing how farming is related to relief.

The Saône joins the swift-flowing Rhône at Lyons, a city of over 1 million people which so dominates the economic life of the valley and adjacent upland and mountain regions that some French geographers distinguish 'La région Lyonnaise' (Fig. 101). Farming is still an important occupation with dairying and stock-rearing predominating in the mountain areas, while the valleys have a varied agriculture. Wheat, maize, sugar-beet, tobacco and fodder crops are widely grown with vines on the hill-slopes. Fruit growing is of great importance with orchards of peaches dominant; apples, pears, apricots and cherries are also grown.

However it is from its industrialisation that the Lyons region derives its unity. Fig. 101 shows the coalfields in the plateau country between the Rhône and the Loire. Though of declining importance today, in the nineteenth century they gave rise to the iron and steel and heavy engineering industries of St. Etienne, Roanne and Le Creusot, the latter being famous for armaments. Coal was also the source of power in the silk mills which were supplied with raw silk from silk worms reared on mulberry leaves in the Rhône Valley, or from the Far East. The source of power in the twentieth century has been mainly hydro-electric power from the High Alps. The abundance of this power led to the establishment of electro-chemical and electro-metallurgical industries in the valleys of the Isère above Grenoble. St Jean de Maurienne has the largest aluminium works in Europe. Today,

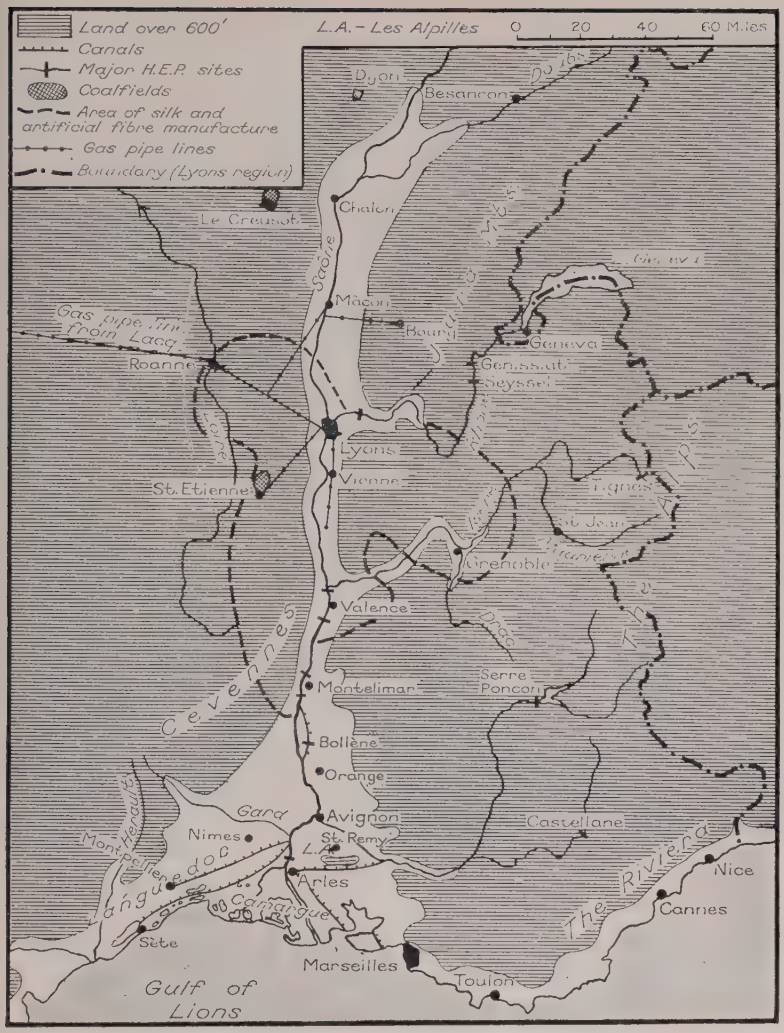


FIG. 101. THE RHÔNE-SAÔNE VALLEY.

the most modern hydro-electric power plants are along the Rhône Valley, part of a regional scheme to improve navigation and supply water for irrigation as well. The Rhône Valley below Lyons consists of a series of fertile basins separated by low ridges of harder

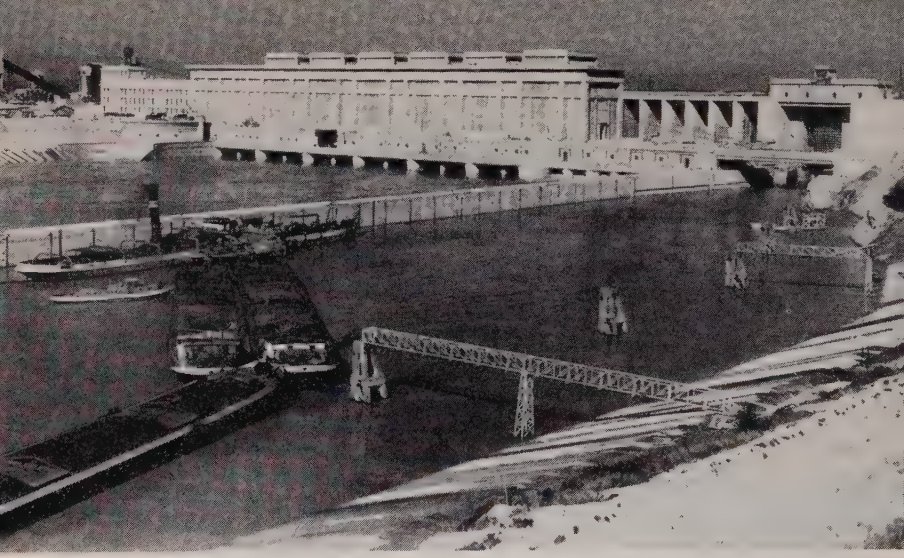


FIG. 102. ANDRE BLONDEL POWER STATION NEAR BOLLÈNE.

rock. Fig. 101 shows where the Donzère-Mondragon Canal has been constructed. The hydro-electric power station at Bollène is shown in Fig. 102, together with the canal leading to the lock, an important part of the navigation improvement scheme.

Oil is widely used as a source of power and raw material for chemical industries. The European pipeline (see Fig. 80) brings oil to a new refinery at Lyons and natural gas from Lacq (see page 124) is also piped to the area. In the future, atomic power will be introduced in larger quantities.

Lyons still has a reputation for high-quality fabrics but only 5 per cent. are produced from natural silk, synthetic fibres such as nylon and terylene having replaced it. The production of these fibres is closely linked with the chemical industry which is now of major importance in the Rhône Valley, with huge factories at intervals along the river between Lyons and Valence. The industries of Lyons itself are varied, for in addition to textiles and chemicals there is heavy engineering, electrical engineering, and the production of commercial vehicles. Grenoble, an Alpine route centre, manufactures machinery, particularly equipment for power stations, and has thriving textile, paper, electronic and food industries.

FIG. 103. INTENSIVE FARMING IN THE RHÔNE VALLEY.

14. (*a*) Write a paragraph on 'Changes in sources of power in the Lyons region'.

(*b*) Using Figs. 101 and 102, write a brief account of the Donzère-Mondragon scheme.

(*c*) Using Fig. 101 describe the extent of the silk-manufacturing region, mentioning some of the important towns.

LYONS	*J.*	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	2	4	8	11	15	19	21	20	17	12	7	3	
Rainfall ins.	1·4	1·4	1·8	2·1	2·8	2·9	2·8	2·9	3·1	3·1	2·6	1·9	28·8
MARSEILLES													
Temp. °C	7	7	8	10	13	17	20	25	24	19	15	11	
Rainfall ins.	1·9	1·5	1·8	2·0	1·9	1·0	0·6	0·9	2·6	3·7	2·1	3·2	23·2

15. (*a*) Draw temperature and rainfall graphs of Lyons and Marseilles.
(*b*) Compare the distribution of rainfall at these places.

The parts of southern France which have most of their rain in winter are usually called *Le Midi* (The South). There is a gradual transition to a Mediterranean climate along the Rhône Valley. Fig. 103 shows a typical area of intensively farmed country in Le Midi, east of Avignon, the chief market town and route centre of the lower Rhône. A characteristic feature is the cypress hedges, planted to protect the crops from a cold wind, the *Mistral*, which sweeps down the valley from the surrounding mountains in the early months of the year. In spring it can do serious damage to the crops and orchards.

The mountains in the distance are the Alpilles, a limestone ridge which extends westwards from the Alps into the Rhône Valley.

Fig. 104 shows an area to the north of this ridge where Monsieur Perret has a holding in five scattered plots. In the past, typical Mediterranean farming was practised with vines and olives on the dry limestone slopes and wheat on the drained land in the north. Today the cultivation of early vegetables (*primeurs*) is the farmers' chief interest, and fruit growing is being extended. Monsieur Perret's plots are used as follows:

1. ½ acre. The house stands on this plot which is also used for vegetables.

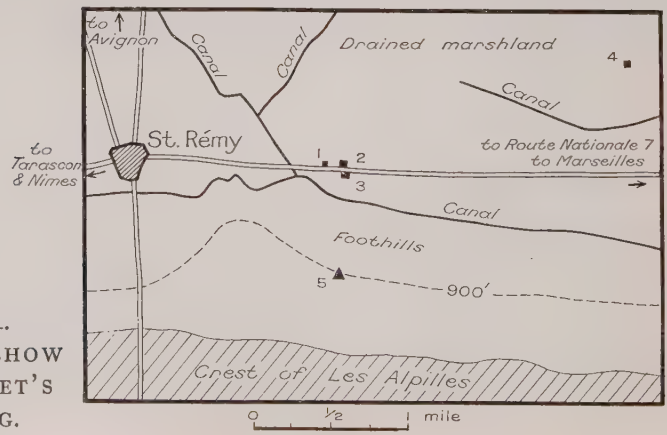


FIG. 104. MAP TO SHOW M. PERRET'S HOLDING.

September–October	Planting of lettuce.
April	Harvesting of lettuce.
May	Sowing of haricot beans.
June–August	Harvesting of haricot beans.

2 & 3. $2\frac{1}{4}$ acres each. These are divided into strips with peppers, tomatoes, aubergines grown in the proportion 4:1:1 in the summer. Lettuce follows as the winter crop.

4. 3 acres. Wheat was grown here until recently but now Golden Delicious apples have been planted as fruit growing is becoming more profitable than primeurs.

5. $1\frac{1}{2}$ acres. This is mainly an old limestone quarry and stonemason's yard overgrown with garrigue and pines.

This intensive cultivation needs irrigation from the end of April to the end of October. Monsieur Perret pays £5 per acre to the local irrigation syndicate for water available every three days. He cooperates with other farms in keeping the ditches clear in winter. A contractor does the heavy ploughing but Monsieur Perret does most of the rest of the work himself with the aid of various hand tools and a motor cultivator for harrowing and weeding. Fertilizing and spraying are essential operations. He goes daily to the market at St. Remy where middle-men buy his produce and send it to the Paris markets mainly by road. Some produce even reaches Britain and Germany.

The art of being a successful primeur cultivator is to have produce ready early when the prices are high.

16. (*a*) How far is plot 4 from the house?
(*b*) How far is the house from St. Remy?
(*c*) Why is irrigation necessary?
(*d*) What is the source of the water?
(*e*) What is the total of Monsieur Perret's irrigation bill?
(*f*) What is the total acreage of Monsieur Perret's holding?
(*g*) Why is it possible to make a living from such a small acreage?
(*h*) Draw a diagram to illustrate the work throughout the year.
17. (*a*) How far is it to Paris?
(*b*) Describe the journey.
18. (*a*) Compare the climate of St. Remy with that of Yithion (Chapter I).
(*b*) Compare and contrast the farming of Yithion with that of St. Remy.

Today there is no port at the mouth of the Rhône, though Arles was a port in Roman times. Sands and gravels brought down by the river have built up an extensive delta intersected by the many distributaries of the Rhône. In the past, this was a desolate area known as the Camargue, used mainly for winter pasture for sheep which spent the summer on the High Alpine pastures. This transhumance is still practised to some extent, the sheep being transported by lorry. Irrigation, however, has made possible cultivation of vines and fruit and the large-scale cultivation of rice by modern methods. One large farm has 1,200 of its 1,500 acres under rice and it possesses fourteen tractors, four combine harvesters and other modern equipment. Two-thirds of France's rice comes from these modern mechanised farms.

The region west of the Rhône centred on Montpellier, called Languedoc, has long been famous for large-scale vine cultivation. It produces the cheaper wines consumed daily by the French people while some of the special, named wines are exported. A new lease of life has been brought to the area by a planned development project. Water is led by a canal 100 miles long from the Rhône above Arles to the lower Hérault River and it is planned to extend it farther west. Water is distributed to the fields by sprinklers and this has stimulated the growth of fruit and vegetables and reduced the farmers' dependence on vineyards. Several canneries have been established to deal with the produce. Consolidation of land holdings, making possible the extension of modern methods, and improved transport are bringing a new prosperity to Languedoc.

East of the Rhône, the Alps are drained by the River Durance which formerly experienced floods alternating with periods of very low water. The river has now been regulated by a series of dams and the lower part has been diverted to Etang de Berre, providing irrigation water for the dry area through which it passes. The Alps reach the sea along the Riviera coast famous for its winter holiday resorts. Farming in the valleys and basins produces wheat, olives, early vegetables and flowers, while vines are grown on the hillslopes. Perfume is produced at Grasse.

19. (*a*) Suggest why Languedoc has been called 'Une Californie française'.

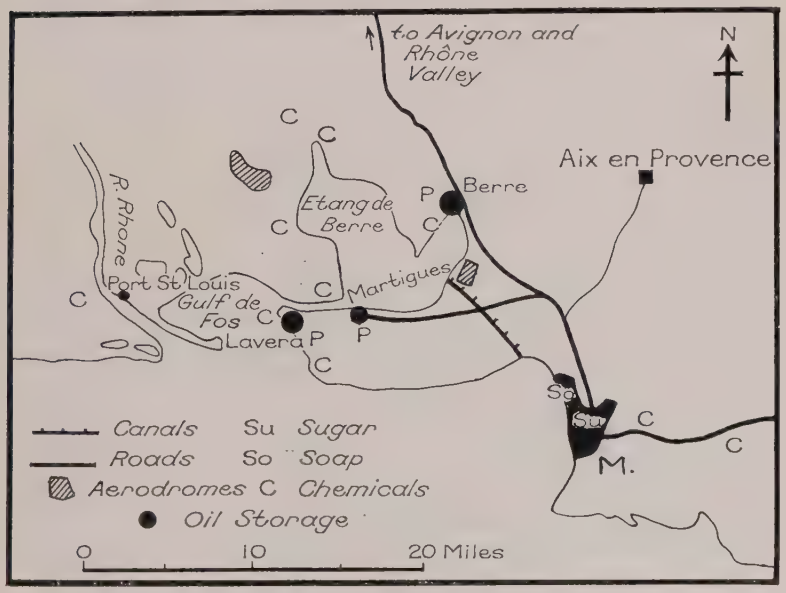
(*b*) Compare modern farming in Languedoc with that of the farm in Fig. 104.

(*c*) What are the advantages of the scheme to control the River Durance?

20. (*a*) (i) Why is the Riveria coast famous for its holiday resorts?
(ii) Name some of these.
(*b*) Compare and contrast the coastline east and west of the Rhône.

Marseilles, with a population of over 1 million, is the second city of France and its chief port. It has developed from a Greek settlement on a small harbour on the rocky coast to the east of the Rhône delta. Fig. 105 shows how it has developed far beyond the original harbour, particularly in a westerly direction where oil storage and refineries have been constructed round the Etang de Berre, the origin of the European pipeline. Further development is taking place round the Gulf de Fos which will be the terminus of the Rhône navigation when it is completed. Though oil from North Africa and the Middle East is now the dominant import, imports from the former French colonies in Africa and Asia are

FIG. 105. MARSEILLES.



still important, especially fruit, coffee, sugar, oil seeds, tropical timber, wine and early vegetables. Marseilles is also an important passenger port at France's southern gateway. The port industries, soap-making, suger-refining and chemicals, are based on imports. The petro-chemical industry has increased with the development of traffic in oil and heavy engineering is of growing importance.

West of the Rhône, Sète is a small port with oil refineries and is also the chief fishing port of the Mediterranean coast. Six new modern planned holiday resorts are under construction along this coast.

21. (*a*) Why has Marseilles expanded to the west rather than to the east?
(*b*) What planned future developments are likely to cause increased prosperity in Marseilles?
(*c*) Name the new refinery centres on Etang de Berre.
(*d*) (i) How far does Marseilles' oil hinterland extend? (Fig. 80). (ii) What is Marseilles' great advantage over the Channel and North Sea oil ports?
(*e*) Compare and contrast the site of Marseilles and Sète.
22. (*a*) Draw a large sketch map to show the Rhône-Saône valley and surrounding mountains. Mark and name the chief towns.
(*b*) In the margin write notes on (i) Agriculture, (ii) Industries.

Central and South-West France

West of the Rhône-Saône Valley, France is on the whole less prosperous, though efforts are being made to stimulate developments in areas away from the main centres of activity. In the heart of France is the Central Plateau, a Hercynian block consisting largely of ancient crystalline rocks, though in the south-west is the region of Les Causses, massive limestone plateaux into which rivers have cut spectacular gorges. The highest parts of the Central Plateau are formed from relatively recent outpourings of lava and the hills (known as puys) have the characteristic volcanic form.

23. Study an atlas map of the region.
(*a*) (i) Name the high south edge of the Plateau; (ii) state the maximum height.
(*b*) (i) Name the highest points, giving their exact heights. (ii) How were they formed?
(*c*) What important French rivers and their tributaries rise in this area?

Most of the Central Plateau is thinly peopled and is a region of depopulation. Farming has been described as 'L'agriculture d'hier dans L'Europe de demain'. On the bleaker uplands cattle-rearing with the growth of hardy cereals and fodder crops is the main type of farming, while in the valleys and on the volcanic soils wheat and maize are grown. On Les Causses sheep are widely reared: their milk is used for the manufacture of Roquefort cheese and the skins are used in local leather industries.

We have seen that the eastern part of the plateau shares in the general prosperity of the Lyons region but elsewhere conditions for industrial development are poor. The small coalfields of all southern France account for only 4 per cent. of French production and about half of the hydro-electric power generated in the upper Tarn and Dordogne valleys is transmitted outside the region. There are two notable exceptions to this general backwardness: Limoges in the north-west is the centre of the French porcelain industry based on local deposits of china clay; and Clermont Ferrand is the centre of the French rubber industry, with Michelin tyres as the main product.

The Garonne and its tributaries drain the basin of Aquitaine in the far south-west. The basin is floored by tertiary sands, clays and limestones giving rise to varied relief and soils. The traveller from Paris to Bordeaux finds it difficult to recognise where the Paris Basin ends and Aquitaine begins, but the ancient town of Poitiers is usually regarded as the gateway to the south-west. The landscape gradually becomes more wooded and there is a great variety of crops in smaller patches. Maize, vegetables and tobacco, as well as wheat, lucerne and sugar-beet are seen in the fields. Above all, there are the vineyards, which are most extensive in the Bordeaux region where farms specialise in the production of well-known wines such as Claret and Sauternes. Fig. 106 shows a typical scene in September. South of Bordeaux is Les Landes, formerly an area of drifting sand, heath and marsh but now an area of pine forests. The Aquitaine Basin is hemmed in on the south by the high ramparts of the Pyrenees. Alpine farming is carried on and hydro-electric power produced but tourism is an important source of income. Pau and Lourdes are the main centres with Biarritz on the south-west coast.

FIG. 106. A VINEYARD NEAR BORDEAUX.

In recent years there have been some striking industrial developments in the south-west which promise well for the future. Oil has been discovered at Parentis in Les Landes and in the Pyrenean foothills while Lacq near Pau is the centre of a natural gas field. Some gas is sent by pipeline as far as Nantes, Lyons (see page 115) and Paris. More important still has been the development of modern science-based industries at the old city of Toulouse, which is now the fourth city and sometimes called 'the aerospace capital of France'. It is an important centre for aircraft, space research, electronic and computer industries. A factor in their development has been the presence of the university with a strongly developed science faculty. Communication with Bordeaux along the Garonne Valley is good while road, rail and canal use the Gate of Carcassonne to link with Mediterranean France.

Bordeaux, at the head of navigation on the Garonne, is the sixth port of France. Exports include wine, timber and industrial products while imports are mainly tropical products and, as else-

where, oil. New docks have been constructed on the downstream side with Pauillac as an outport and Ambès as a tanker port with refineries. To the traditional food-processing industries have been added modern chemical, paper and engineering industries.

24. Draw a large sketch map to illustrate the geography of the Aquitaine Basin showing rivers, surrounding hills and chief towns.
25. Study the picture (Fig. 106).
    (*a*) How are the vines grown?
    (*b*) (i) How does the land differ from that of the Burgundy and Champagne vineyards? (ii) Suggest a reason.
    (*c*) Describe the scene.
    (*d*) What suggests that the town in the background is old?
26. (*a*) Study the coastline of Les Landes in your atlas and suggest how it was formed.
    (*b*) From your atlas write a brief account of the chief characteristics of the Pyrenees.
    (*c*) Suggest how the climate of the Aquitaine Basin differs from that of Le Midi.
27. (*a*) (i) Name the modern aircraft built at Toulouse in co-operation with the British aircraft industry. (ii) Which English city is involved in this project?
    (*b*) Toulouse has overtaken Lille as the fourth city of France. What is the significance of this?

Fig. 107 shows the Armorican region of France, an area of ancient sandstones, shales and slates folded in the Armorican (Hercynian) earth movements at the end of Paleozoic times. Intrusions of granite also occurred. The resulting high mountain range was reduced by erosion and later uplifted to form a low plateau. The most striking relief features are the deep valleys cut into the plateau surface and the rugged coastline with many drowned valleys or *rias*.

Like the Central Plateau, this is a region of falling population somewhat isolated from the main centres of economic activity. Breton, a Celtic language similar to Welsh is still spoken in the far West. In the background of Fig. 108 is the typical farming landscape known as *bocage*. In the Cotentin peninsula more than half the land is pasture and cattle, sheep and pigs are reared. Milk is made into butter and the cheeses for which Normandy is famous. Barley, oats, potatoes and fodder crops are grown. In Brittany the proportion of pasture is lower, for there is an extensive area of early

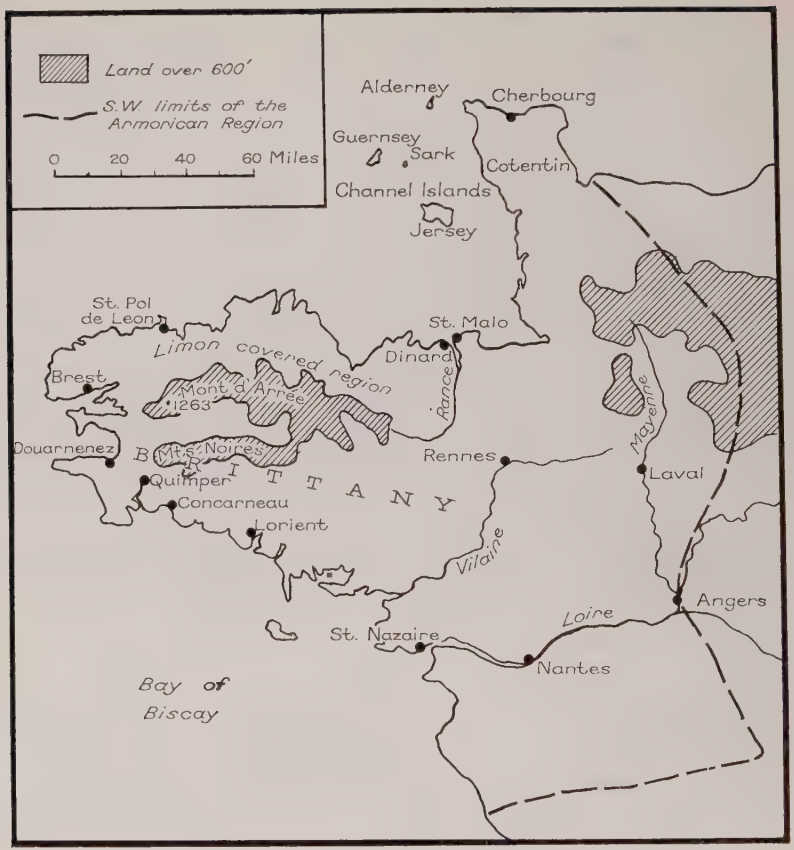


FIG. 107. THE ARMORICAN REGION.

vegetable production in the northern part where there are deposits of limon. Cauliflowers are cut from January to May, early potatoes are lifted in April, main-crop potatoes and globe artichokes from April to August, and onions in December. Some of this produce is sent to Britain by sea, Breton onion sellers being a familiar sight in British towns. Recently special freight trains have been operating from St. Pol de Léon, reaching Munich in 30 hours and Rotterdam in 27 hours. Near the south coast peas and haricot beans are grown and canned and there is also an extensive market-

FIG. 108. AERIAL VIEW OF CONCARNEAU IN BRITTANY.

gardening region along the lower Loire. Throughout the Armorican region great attempts are being made to improve the efficiency of farming: fields are being enlarged to make the use of machinery possible, cattle breeding is being improved and there has been an extension of co-operative creameries.

28. (*a*) (i) Describe the landscape in Fig. 108. (ii) How does it differ from that of the Paris Basin?

BREST

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	7	7	8	10	13	16	17	18	16	13	9	8	
Rainfall ins.	3·5	3·0	2·5	2·5	1·9	2·0	2·0	2·2	2·3	3·6	4·2	4·4	34·1

29. (*a*) Draw a graph to show the temperature and rainfall figures of Brest.
(*b*) Compare the range of temperature with that of Paris.
(*c*) Compare the rainfall with that of Paris.
(*d*) What is this type of climate called?
(*e*) How does the climate favour (i) dairy farming; (ii) the growth of early vegetables?
30. (*a*) (i) Contrast the soil of the crystalline rocks and the limon-covered areas. (ii) How is this reflected in the agriculture?
(*b*) Draw a diagram to show vegetable cultivation near St. Pol de Léon.
(*c*) Compare it with that of the 'primeur' region round Avignon.
31. The Channel Islands are politically part of Britain and physically part of France. Explain this and suggest how they were formed.

After Boulogne, four of the chief French fishing ports are in Brittany. The southern ports Concarneau and Lorient concentrate on the tunny and sardine fisheries of the Bay of Biscay and farther south. Much of the catch goes to local canneries. Douarnenez participates in these fisheries but also sends trawlers to the continental shelf off Britain and Ireland in the winter months. From St. Malo go distant-water trawlers to northern waters, but many old fishing villages have become holiday resorts. Brest and Lorient are naval bases while Cherbourg is a port of call for Atlantic liners.

In the absence of mineral or power resources industrialisation has been slow. However, the first modern tidal power station in the world has been built across the estuary of the Rance near St. Malo, making use of the exceptionally large tidal range of 34 feet. Rennes and Le Mans have gained from the decentralisation policy and have car and agricultural machinery factories. Nantes and its outport St. Nazaire are within the Armorican region though their hinterland is more extensive. Fertilisers, timber and fruit are imported and oil comes to the new refineries. Industries include iron and steel, chemical works and the manufacture of aircraft parts.

Additional Exercises for Chapter VI

32. (*a*) Draw a sketch of Concarneau harbour (Fig. 108) noting the old walled town, the fishing harbour and the yachting harbour.
(*b*) Draw a sketch map to illustrate the fishing industry of Brittany.
33. Draw a sketch map to show the major regions of France described in this chapter.

34. (*a*) 'In France the three main structural features of Europe converge.' (i) What are they? (ii) Describe their distribution.
35. 'France is the bridge between Maritime Europe and Mediterranean Europe.' Discuss this statement.
36. 'There have been tremendous developments in the economy of France since the war.' List these under three headings, (i) Agriculture, (ii) Industry, (iii) Transport.
37. Draw a sketch map to show the main wine producing areas mentioned in this chapter.
38.

	Energy 1965	
	Production %	*Consumption* %
coal	63·5	40·5
oil	4·9	43·2
gas	9·6	5·0
hydraulic and nuclear	22·0	11·3

(*a*) Draw pie graphs to show the above figures.
(*b*) Where are these sources of energy obtained?
(*c*) For what source of energy does France rely heavily on imports?

39. From what you have learned in this chapter make a list of France's exports under the heading (*a*) Agriculture, (*b*) Consumer goods (see Fig. 1).
40. Using Fig. 93 write a paragraph on the distribution of population in France.

CHAPTER VII

THE ALPINE COUNTRIES

MAP 2 (back endpaper) shows part of the Swiss Alps near the French frontier which can be seen in the south-west corner. You will notice that contours (numbered in metres) are used for showing relief and that they are far more numerous than on any British Ordnance Survey Map. There is also shading which helps to give a three-dimensional effect. To understand it, you must imagine a relief model with a light from the north-west shining on it. The slopes facing north-west are lighter than those facing south-east which are shaded grey to indicate the shadow. This method of showing relief helps you to distinguish crests of ridges and valley bottoms. The large patches of green overlying the shading indicate woodland. In answering the following questions pages 170–180 in Book 3 would be useful.

1. (*a*) On the Swiss map 2 cm represent 1 km. Draw a scale line to show 8 km (5 miles). Divide this into 5 equal parts each representing one mile.
   (*b*) Is this map on a larger or smaller scale than (i) the British One inch to one mile map? (ii) Map 1 (front endpaper)?
2. (*a*) What is the contour interval?
   (*b*) Which contours are emphasized?
   (*c*) How are contours on the ice surfaces in the south-west shown?
3. Copy the following description in your note-book, filling in the gaps: The highest point on the map is the Pite Fourche in the south-west corner reaching ..... metres (..... feet). This is a cone from which radiate several sharp-edged ridges, the one trending north-east is called ....., reaching heights of ..... metres. This kind of ridge is known as an *arête* while the hollows in between are called *cirques*. The Plâteau de Trient is a permanent snow field which feeds two glaciers, ... to the north and ..... to the east. Near the southern edge of the map is another glacier from snow fields farther south: the river ..... emerges from the *snout* of this glacier at ..... metres.

FIG. 109. ORSIÈRES IN THE DRANCE VALLEY.

4. (*a*) Draw a sketch map to illustrate the above account.
   (*b*) Indicate the *cabanes* (shelters) used by climbers and the tracks which lead to them.
5. (*a*) Draw a sketch profile of the Val d'Arpette from Fenêtre d'Arpette to Champex d'en Haut.
   (*b*) This is a *hanging valley* well above the level of the main valley at Champex d'en Haut to which the stream drops steeply. Indicate this on your profile.
6. What is the general height of the upper limit of the forest?
7. Draw a cross profile of the Val d'Arpette near Champex en Bas to show the characteristic U shape of a glaciated valley.

Although there are some small settlements and the summer tourist resort of Champex in the Arpette valley, the main area of settlement is the Drance valley to the east. The river has two main branches, Drance de Ferret in the west and Drance d'Entremont in the east. The latter valley is followed by the road to the Great St. Bernard Pass.

Fig. 109 taken from the slopes above the power station (U.E.) with the camera pointing north shows the largest settlement, Orsières (population 900) which acts as a service centre for the villages of its commune (total population 2,000). The valley has

been cut along a zone of relatively soft sedimentary rocks (mainly limestone) between the granites of the Mont Blanc Massif to the west and other resistant crystalline rocks to the east. The cultivated slopes seen in the picture are covered with *moraine* brought down by glaciers during the Great Ice Age.

8. (*a*) Suggest two reasons why Orsières is the chief settlement.
   (*b*) (i) What is the difference in height between Orsières and Champex?
   (ii) What is the gradient of the slope?
   (iii) Comment on the course of the road between the two settlements.
   (*c*) Draw a sketch map to show the communications of Orsières.
9. (*a*) List the villages in Val Ferret and state their heights.
   (*b*) List the villages along the main valley below Orsières and state their heights.
   (*c*) What differences do you notice in site and height?
   (*d*) Where would you find comparable heights in Britain?

We must now enquire how the 2,000 people in the commune of Orsières make a living. Farming is still the chief occupation, though for many it is combined with another occupation such as trade, construction or public service. Most farmers keep a few

FIG. 110. A SMALL TRACTOR IN USE.

FIG. 111. STRAWBERRIES IRRIGATED BY A SPRAY DEVICE.

cattle (3 to 6) which are stall-fed in the barns during the hard winter, but from mid-June to mid-September they graze on the Alpine pastures above the forests on the east side of the valley or ten miles away at the head of Val Ferret. The 1,500 cows of Orsières are in the charge of a small group of herdsmen and cheese makers. Modern transport makes it possible for some milk to be sent to the villages daily. In some areas milk is sent down by plastic pipeline (*le pipe lait*). In the valley bottoms and on the moraine-covered slopes, the land is carefully cultivated with hay yielding two crops a year. Other crops grown for feeding the animals are barley, oats and mangolds. A little wheat is grown and there are many orchards and patches of vegetables. Strawberries are a cash crop and are sent in refrigerated railway trucks to all parts of Switzerland and even to Germany. At present modernization of farming is handicapped by the fact that a farmer may have as many as twenty scattered plots in his holding of five acres. Nevertheless there has been some mechanisation; small tractors, adapted to the steep slopes, are now widespread, drawing all kinds of machinery and trailers (Fig. 110).

10. Farming round Orsières has been described as 'subsistence farming with two cash products'. Explain this.
11. (*a*) What was the original advantage of scattered farm plots in a mountain region?
    (*b*) Why is the Swiss government encouraging land consolidation?
12. Fig. 111 shows a spray irrigation device. Suggest why this is necessary.

Some industry has developed in this area using hydro-electric power. At the north end of Orsières is a saw mill which uses some local timber to produce planks and joinery. About 30 men are employed. There is also a new nylon thread factory seen in the foreground of Fig. 109 and farther down the valley there is a watch factory. These two factories give employment mainly to women. Canton Valais, in which Orsières is situated, produces one-third of the total hydro-electric power of Switzerland. Some is used in the electro-chemical and electro-metallurgical industries in the upper Rhône valley but most of it is fed to the Swiss electricity grid. There are some huge modern schemes in the high valleys near the Italian frontier (Fig. 114). Much labour is needed at the construction stage, but thereafter only a few engineers are needed to maintain the plant. There is urgent need to attract more industry to the high Alps to halt depopulation.

Tourism, which is an important source of income in many Alpine valleys, is not strongly developed in the Orsières area. Champex is a small summer tourist resort by the side of an artificial lake and Orsières with three hotels provides services for tourists along the great St. Bernard road. In some valleys where there are good winter sports facilities, the people have given up their traditional way of life and even milk has to be brought from elsewhere.

13. (*a*) Draw a sketch to illustrate the hydro-electric power scheme at Orsières. The blue dotted line on the map indicates artificial water-courses.
    (*b*) What is the origin of the water?
    (*c*) How is it conveyed to the point 1,302 metres?
    (*d*) How far does the water descend through penstocks (pipes) to reach the power station? This is called the *head* of water.
14. Can you suggest why Orsières has no facilities for winter sports?
15. Figs. 112 and 113 show the Berwang valley in the Tyrol (Austria).

FIG. 112. BERWANG VALLEY IN WINTER.

FIG. 113. BERWANG VALLEY IN SUMMER.

(*a*) Draw a sketch to show the areas of permanent snow, an area of Alpine pasture, the upper and lower levels of the forest.
(*b*) Describe the land use round the villages in summer. How does it compare with that of Orsières?
(*c*) What evidence is there that this is a winter sports centre?
(*d*) The two pictures were taken in different years. Which is the more recent? Can you suggest why?

The contrast between winter and summer in the Alps is striking. In summer high temperatures are recorded in the sheltered valleys but cultivation depends very much on aspect. From early December the high valleys are snow-bound and the Alpine passes are closed. Added to the discomfort of low temperatures is the constant danger of avalanches. The following account is taken from *Avalanche* by Weschberg.

> On 22 December 1952 a train from Paris bringing people for winter sports drew into Langen station, west of the Arlberg Pass in Western Austria. The sky was deep grey and since noon the föhn, a dry warm wind from the south and south-west, had been blowing. The Weather Forecast at 10.0 a.m. had said—'In the entire region of the Alps there is a danger of wind slab avalanches especially on eastern exposed slopes. From the slopes where large masses of snow have been accumulated by strong winds, avalanches may descend all the way to the valley floor.' A coach load of 35 skiers was crossing a bridge when, in the words of one of the eleven survivors, 'First there was a roar and darkness and a blast of wind. I couldn't breathe. I felt as if my lungs were being pulled out of my body. Then the bus was lifted up into the air. We began rolling. Snow and water poured through the broken windows. I lost consciousness.'

This avalanche was only 15 feet wide, but the coach lay in its path. Fig. 114 shows an avalanche which descended to the Mattmark valley on 31 August 1965. This is well above the limit of permanent settlement near the Italian frontier. A temporary encampment built to house the workers employed in the construction of a dam as part of a hydro-electric power scheme was buried beneath the snow and rock killing about 100 workers.

Every year thousands of similar avalanches come down from the mountains to the valleys. Most of them fall in uninhabited areas but when a settlement or a road lies along their track, disasters can occur. The föhn wind is warmed by compression as it

FIG. 114. AN AVALANCHE IN THE MATTMARK VALLEY.

descends the northern slopes of the Alps. It is similar to the Chinook (Book 3, page 192).

16. Why are the slopes above the power station at Orsières mainly forested rather than cultivated?
17. Vines are grown on the slopes of the Upper Rhône Valley. In which direction do the best slopes face and why?
18. (*a*) What are the characteristics of the föhn wind?
    (*b*) Draw a diagram to illustrate.
    (*c*) Why does the föhn wind make avalanches a possibility?
    (*d*) Which slopes are mentioned in the weather forecast, and why?
19. (*a*) What do avalanches bring down?
    (*b*) What could afford some protection to the villages?
20. Draw a sketch to show the main features of Fig. 114. Indicate the route of the road and the position of the encampment.
21. (*a*) Draw a graph to illustrate the temperature and rainfall of Innsbruck situated at 1,909 feet in the heart of Tyrol.

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	−3	0	5	10	14	17	20	21	15	9	4	−1	
Rainfall ins.	2·1	1·8	1·5	2·2	2·9	4·1	5·1	4·5	3·1	2·4	2·2	1·9	33·8

(*b*) How far does your graph illustrate a continental climate?

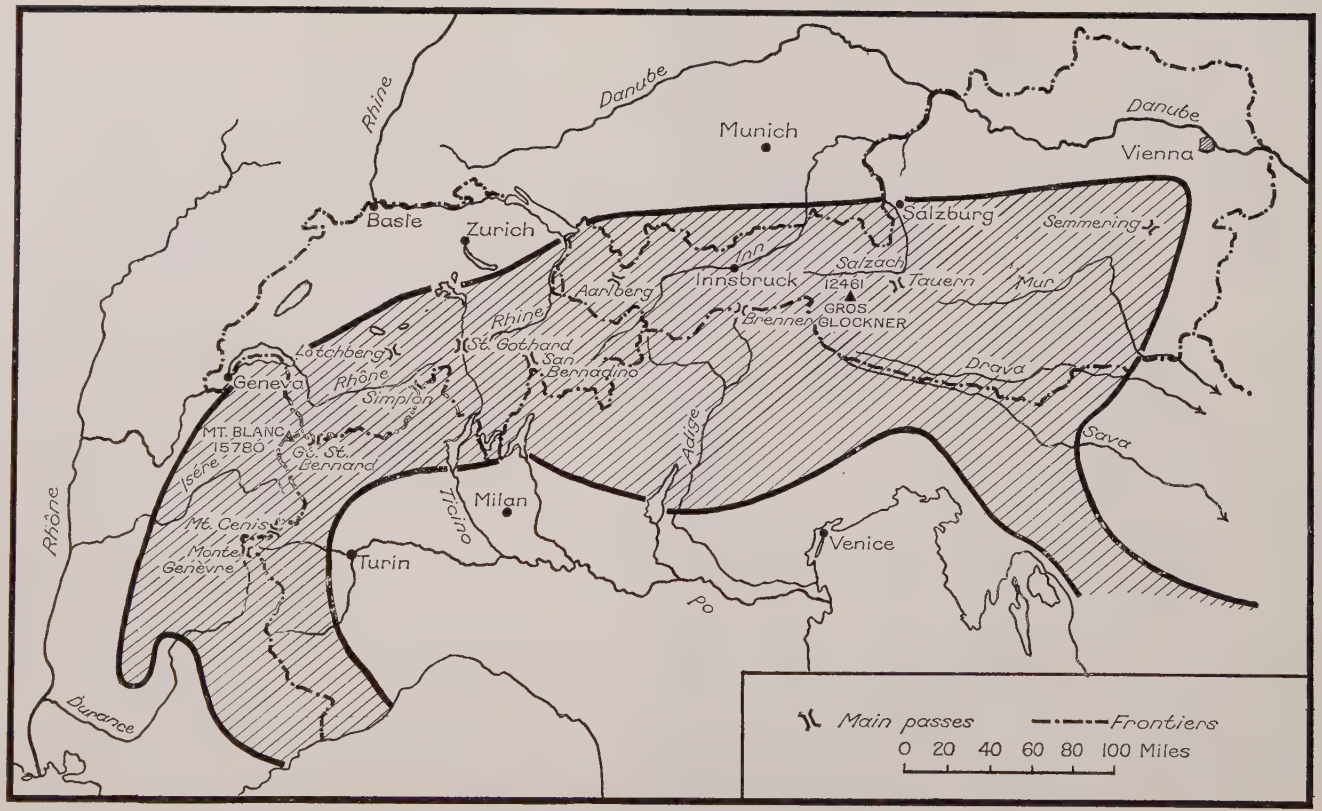


FIG. 115. THE ALPS.

Fig. 115 shows the whole range of the Alps which extends north from the Mediterranean coast of France and Italy reaching its highest point in Mont Blanc near the Swiss frontier. Beyond here it swings round trending from west to east through Switzerland and Austria where it gradually falls in height towards the Hungarian plains. Much of the range consists of sedimentary rocks folded in the Alpine Earth Movement (Chapter I). Some of the highest peaks are formed of crystalline rocks torn from the floor of the geosyncline or of granite intrusions which accompanied the 'earth storm'. One such area is the Mont Blanc Massif, part of which is seen to the west of the Drance valley on the endpaper map. The Hohe Tauern Massif in Austria is another. Four major European rivers and their tributaries rise in the Alps, sometimes called 'the watershed of Europe'. In their valleys, of which the Drance is typical, are the main settlements and many are important routeways leading to the Great Alpine Passes used by traders and armies from Hannibal to Napoleon. These passes are blocked by snow from December until May or June, but the construction of railway tunnels and, more recently, road tunnels has made all-the-year-round travel possible. The table below shows the main passes and tunnels.

Road and Railway	*Road only*	*Railway*
Mont Cenis	Mont Genèvre	Lötschborg tunnel
Simplon	Mont Blanc	
St. Gotthard	road tunnel	
Brenner	Great St. Bernard	
Arlberg	(Pass and tunnel)	
Tauern	San Bernadino tunnel	
Semmering	Gross Glockner	

22. How wide are the Alps (*a*) in the narrowest, (*b*) in the widest part?

23. (*a*) What is the height of Mont Blanc?
(*b*) From your atlas find the names and heights of five other peaks.

24. What are the four major rivers which rise in the Alps and where do they reach the sea?

25. The Italian frontier follows the watershed fairly closely. Where is an important exception to this?

26. Using Fig. 115 and your atlas, find out what valleys are linked by the routes shown in the table.

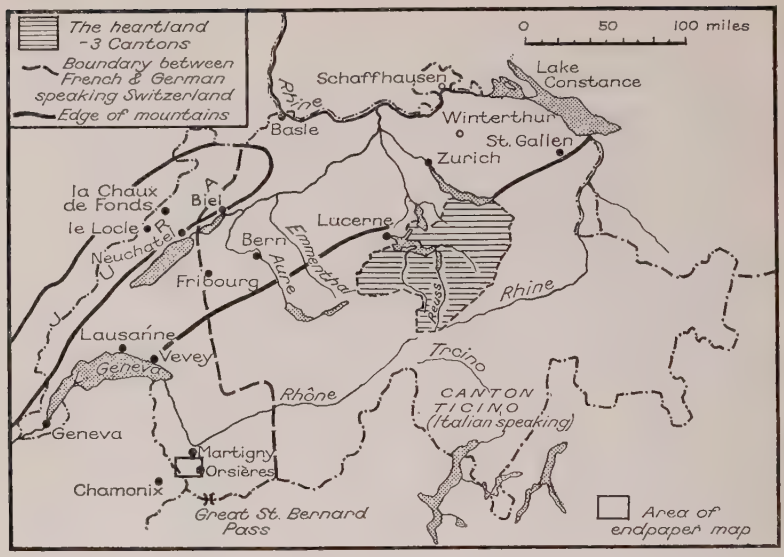


FIG. 116. SWITZERLAND.

Although the Alps cover 60 per cent. of the surface of Switzerland, and 70 per cent. of that of Austria, no town of over 100,000 people is situated there. The densely populated parts of both countries are beyond the Alps, mainly in the Alpine Foreland, more low-lying country consisting of Tertiary sediments covered by glacial deposits. The impeding of the drainage by moraines accounts for the many beautiful lakes on the Foreland.

Switzerland is unique in Europe for, surrounded by powerful neighbours, she has remained independent and neutral for many centuries. There is no Swiss language, the people speaking the languages of adjacent countries. Fig. 116 shows the heartland of the country: the people of three Alpine cantons centred on Lake Lucerne united to defend themselves at the end of the thirteenth century. Other cantons joined until the present boundaries were reached in the early nineteenth century. Untroubled by wars, Switzerland has become one of the most prosperous countries in Europe. Fig. 117, taken with the camera pointing south, shows the river Rhine at the Falls of Schaffhausen. The landscape is similar to that of South Germany (Chapter V). Although it is very

FIG. 117. THE SWISS PLATEAU NEAR SCHAFFHAUSEN.

different from that in the Alps, cattle rearing for milk and beef is still the dominant farm occupation with much meadow and fodder crops, cheeses such as Gruyère and Emmenthal are produced. Wheat, barley, potatoes are widely grown and, in favoured areas, sugar beet, fruit and tobacco. Vineyards occupy south-facing slopes along the shores of Lake Geneva. Fig. 117 also shows factories near to the falls which are harnessed to provide hydro-electric power. There are many such factories in the towns of the Alpine Foreland producing goods noted for skill and precision, for Switzerland has few raw materials. Electrical engineering, machinery, textiles, chemicals and food processing are the chief industries. The table below shows the variety of industry in the five main towns of the Foreland.

	Population in thousands	*Industries*
Zurich	430	Electrical engineering, trucks, machine tools, textiles (cotton, silk and artificial fibres)

Basle	203	Iron and steel, machinery, chemicals, cotton textiles, clothing, printing
Geneva	170	Machinery, instruments, watches and clocks, jewellery
Bern (the capital)	163	Engineering, clothing, printing
Lausanne	118	Tools, instruments, woodworking, paper, printing

Winterthur is an important engineering centre, St. Gallen a textile centre noted for embroidery and Vevey is an important food processing centre, the headquarters of Nestlé.

The watch and clock industry for which Switzerland is world famous reaches its greatest development in the Jura mountains which separate Switzerland and France (page 114). La Chaux de Fonds and Le Locle are the chief centres. There are two major branches of this industry, the making of the tiny parts and the assembly of these parts, both of which require great skill.

27. (*a*) Name the two great lakes which lie along the boundaries of Switzerland.
    (*b*) Name two other lakes in the Alpine Foreland.
    (*c*) How have these been formed?

28. (*a*) From your atlas name Switzerland's three powerful neighbours.
    (*b*) Which language predominates, and where?
    (*c*) Which language is spoken in the Orsières area?
    (*d*) Which language is spoken in the Ticino Canton, and why?

29. Study the picture Fig. 117
    (*a*) In which direction is the river flowing? Give reasons for your answer.
    (*b*) Describe and account for the distribution of woodland.
    (*c*) Compare the field pattern with that of S. Germany (Fig. 78).
    (*d*) On which bank of the Rhine is Schaffhausen?
    (*e*) Draw a sketch to show the main features of the picture.

30. (*a*) Suggest why electrical engineering is an important industry.
    (*b*) Why are industries needing precision so important? Name some.
    (*c*) Suggest why Basle is the centre for the iron and steel industry.
    (*d*) How does Switzerland obtain oil? (Fig. 80).

31. (*a*) Draw a sketch map to show the three main regions of Switzerland. The Alps, The Alpine Foreland and the Jura Mountains.
    (*b*) On your map mark the 5 major towns.
    (*c*) Write a note on the position of each of these.
    (*d*) In which of the three regions are they situated?

FIG. 118. AUSTRIA.

The following table compares Switzerland and Austria:

	Switzerland	*Austria*
Area	16,000 sq. miles	32,000 sq. miles
Population	$5\frac{1}{2}$ million	7 million
Land use % of total area		
Forest	24%	37%
Arable	11%	21%
Meadow and pasture	42%	28%
Waste and built-up areas	23%	14%
Occupations % of people employed		
Industry and craft	42%	38%
Agriculture and forestry	15%	32%
Commerce and hotels	15%	9%
Transport	$4\frac{1}{2}$%	5%

32. (*a*) Compare the size and density of population of the two countries.
(*b*) Draw pie graphs to illustrate the land use and write a note on what they show.
(*c*) Draw pie graphs to illustrate the occupations and comment on the relative importance of each.

The western part of Austria is truly Alpine, but in the east the Alps are lower, more rounded in form, with broad valleys draining east to the Danube plains (see Fig. 118). The Burgenland in the far east of the country is physically part of the Hungarian plains. The Alpine Foreland is drained by the river Danube which

FIG. 119. OPEN CAST IRON ORE 'MINING' IN AUSTRIA.

enters the country below Passau. A regular service of river boats links Passau with Linz and Vienna, taking 13 hours to complete the journey. North of the Danube the land rises to the less fertile crystalline rocks of the Bohemian forest.

Farming in Austria is more varied than that of Switzerland. While cattle rearing with fodder crops is important, there is a far greater acreage of other crops even in the Alpine region. Barley, oats and potatoes are grown where the climate is harsher and soils poorer, while wheat and sugar beet are grown in more favoured areas. Fruit, vine and hops are grown in the sheltered Danube valley.

Austria has more mineral wealth than Switzerland as well as

FIG. 120. THE AUSTRO-HUNGARIAN EMPIRE.

abundant electric power from the Alps and from the Danube. Fig. 119 shows iron 'mining' in the heart of the Alps north of the Mur valley. The whole mountain side has been cut into terraces, one of which is seen in the picture. The ore is used in the iron and steel works at Donawitz. Graz, Austria's second city, has engineering works, and the manufacture of cars, shoes, paper and glass.

Linz, the third city, also has iron and steel works, heavy chemical works and boat building yards, as well as being a river port. In the near-by Enns valley engineering and car manufacture are important. In the Salzach valley centred on Salzburg are electro-chemical, textile, engineering, timber and cement works.

Despite its greater resources, Austria is much less prosperous than Switzerland, for it has not enjoyed political stability. Vienna, the capital, has a population of 1·7 million people, nearly a quarter of the total population. This can be explained by the fact that Vienna was the capital of the Austro-Hungarian Empire (Fig. 120) which broke up after Austria's defeat in the First World War.

Vienna is situated on the Danube near where the river enters the Hungarian plains. It is one of Europe's great historical cities, a centre of culture which attracts thousands of tourists. As well as

being the administrative capital of Austria it is a river port with oil refineries, engineering works and textile and footwear factories.

33. (*a*) Draw a sketch map to show the main regions of Austria and put in the towns mentioned in the above account.
    (*b*) What is the average height of the Alps in Eastern Austria?
34. (*a*) 'Farming in Austria is more subsistence farming than that of the Swiss Plateau.' Explain this.
    (*b*) Why is Burgenland sometimes called 'the granary of Austria'?
35. Study Fig. 119 and describe the method of obtaining iron ore.
36. (*a*) Where can the iron and steel works at Linz obtain supplies of coal and ore?
    (*b*) Suggest where further supplies may be obtained.
37. (*a*) Where is Austria's oil field?
    (*b*) Why is Salzburg so called?
38. Study Fig. 120 and state which present-day countries formed part of the Austro-Hungarian Empire.
39. Vienna has been described as 'a frontier town on the edge of the communist world'. Explain this.

CHAPTER VIII

SOUTHERN EUROPE

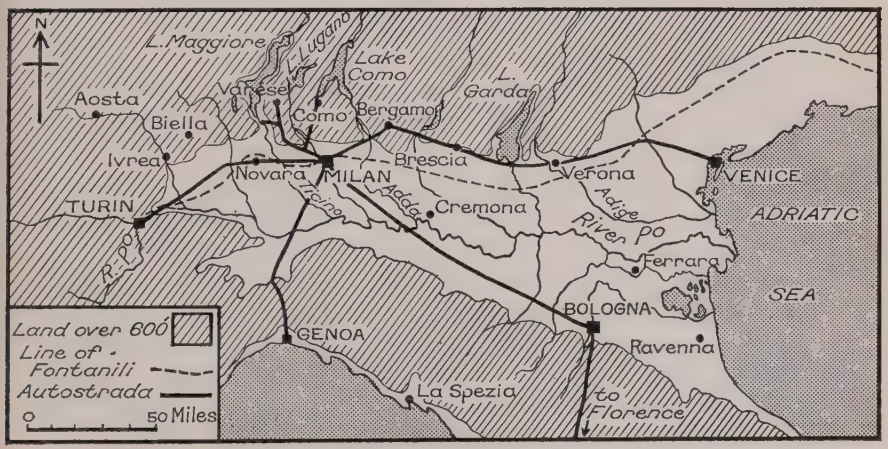
Refer to Chapter I and write paragraphs on (*a*) Relief, (*b*) Climate of the lands round the Mediterranean Sea.

In this chapter we shall study the three peninsulas which make up Southern Europe. While they have many features in common, each has its unique character dependent upon differences in relief. These affect the climate causing variations from the typical Mediterranean climate (Fig. 16).

Italy

In Chapter VI we studied the Alps which sweep in a great arc from the Danube Plains to the Riviera coast of France and Italy. Near Genoa they merge with the Apennines, the folded mountain range which forms the backbone of Italy. Between the Alps and the Apennines is the Lombardy Plain, drained by the River Po and its tributaries (Fig. 121). Formerly a gulf of the sea, it has

FIG. 121. THE LOMBARDY PLAIN.



been filled in by deposits from the Alps and Apennines. This region, with its industrial cities and productive agriculture, is the most prosperous part of Italy.

1. The crest of the Alps is a great watershed.
   (*a*) Name the three great European rivers which drain the northern slopes.
   (*b*) Name the chief Alpine tributaries of the River Po.
   (*c*) Name the famous Italian lakes and suggest a reason for their origin.
2. The crest of the Alps is a frontier.
   (*a*) Name Italy's Alpine neighbours.
   (*b*) Find an exception to the above statement.
   (*c*) Which famous Alpine routeways lead to (i) Turin, (ii) Milan, (iii) Venice? (Fig. 115)
3. (*a*) Describe the shape of the plain of Lombardy.
   (*b*) What suggests that it is increasing in size at the seaward end?
4. (*a*) Compare the latitude of the plain of Lombardy with that of Le Midi in France.

VENICE

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*
Temp.°C	3	5	9	13	18	22	24	24	21	15	9	5
Rainfall ins.	1·6	1·8	2·0	1·6	3·2	2·6	2·8	1·7	2·4	3·4	3·1	2·4

   (*b*) Draw a graph to show the temperature and rainfall of Venice.
   (*c*) How does this climate differ from a typical Mediterranean climate in (i) temperature range; (ii) distribution of rainfall?

Farming in the Italian Alpine valleys is similar to that described in Chapter VII. Round the outer edge of the Lombardy Plain soils are coarse and gravelly, fluvio-glacial deposits derived from the moraines brought down by Alpine glaciers. However along the main river and its tributaries are fertile alluvial soils which, when drained and protected from floods, are highly productive. Between the gravels and the alluvium is a line of springs known as *fontanili* which are useful for irrigation. Fig. 122 shows some features of farming in the north-west of the plain on the fine alluvial soils of the Agogra Valley north of Novara. In the centre is a farm of about 100 acres rented by two families each of eight people who live in the village just to the south. Each farmer keeps a herd of 30 Friesian cattle in the byres which surround a courtyard. The cows rarely graze in the fields but large quantities of hay are

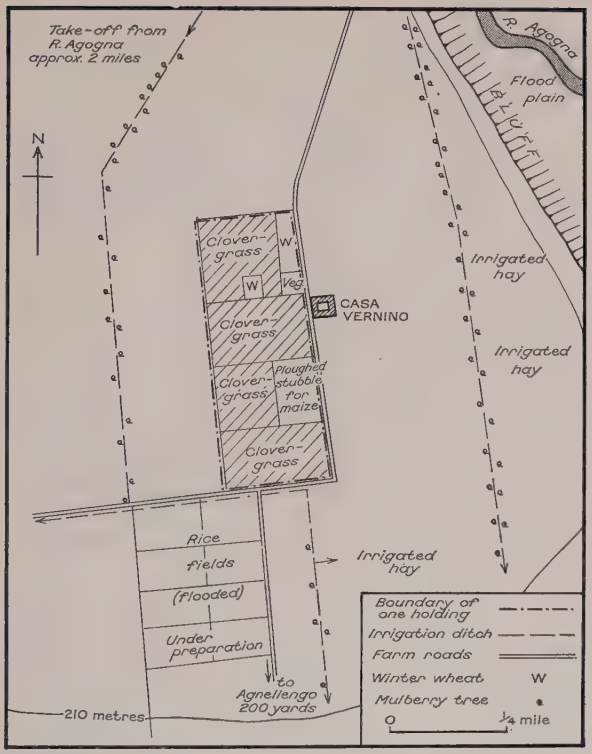


FIG. 122. FARMING IN THE AGOGRA VALLEY—LOMBARDY PLAIN.

produced to feed them. The milk is sold in Novara and some is made into butter, or into Parmesan or Gorgonzola cheese.

Irrigation water is led by canals from the river to the fields. Some of this water is used to grow rice, the land being ploughed, and flooded in May. After smoothing with a harrow the rice seedlings are transplanted from the nurseries (Fig. 123). The harvest is in September and October when the fields have dried out. Though some harvesting is still done by hand, combine harvesters are becoming a more common sight in the rice-fields.

5. (*a*) What other crops are grown on this farm?
   (*b*) Where are the mulberry trees planted and why?
   (*c*) It is possible to get two crops per year on this land. Suggest two reasons for this.
6. (*a*) This is 'a landscape of straight lines'. Give examples.
   (*b*) Name any other landscapes in Europe which can be so described.

FIG. 123. TRANSPLANTING RICE NEAR NOVARA

7. (*a*) How does dairy farming in Lombardy differ from that in Britain?
(*b*) (i) Describe the scene in Fig. 123. (ii) What other countries does it remind you of?

East of this area a typical agricultural landscape shows strips of wheat, maize and fodder with rows of mulberry trees and vines between. Some maize is used to make polenta, a kind of porridge, while the wheat may be used for bread or *pasta* (macaroni, spaghetti, etc.). In the delta region sugar-beet and hemp as well as wheat and maize are grown on large farms, while near Ferrara are extensive orchards of apples, pears and peaches, many of which are exported to Britain.

Northern Italy is the chief industrial area of the country with as many as 70 per cent. of the industrial workers in its large developing cities, which continue to attract people from the surrounding countryside as well as from the underdeveloped south. There is a large number of ancient market towns and route centres in the Lombardy Plain: these have a variety of small-scale industries including textiles, leather, metals and food processing. As Italy has very little coal, her industrial revolution was delayed until the development of hydro-electric power about 1900. Dams and power stations were constructed in the valleys of both the Alps and the Apennines, the area of greatest development being the Bergamo Alps where the Val Malenco dam is the largest in Europe. The chief source of power today is oil imported at Genoa and sent across the Apennines by pipeline. Recently discovered gas fields near Cremona and Ravenna provide an increasing amount of Italy's power and offer considerable hope for future development.

There are iron and steel works at Aosta, Brescia and Turin but the greatest of all is the new works at Genoa which uses imported ore and scrap and American coke. Modern shipyards use some of the steel while the rest is used in the varied engineering industries across the Apennines. Fig. 124 shows one such industry, the famous Fiat motor-car works on the outskirts of Turin, a city of over 1 million people which also has leather, textile and other engineering works. Other famous metal using industries are at Ivrea (typewriters and business machines) and Nochi (sewing

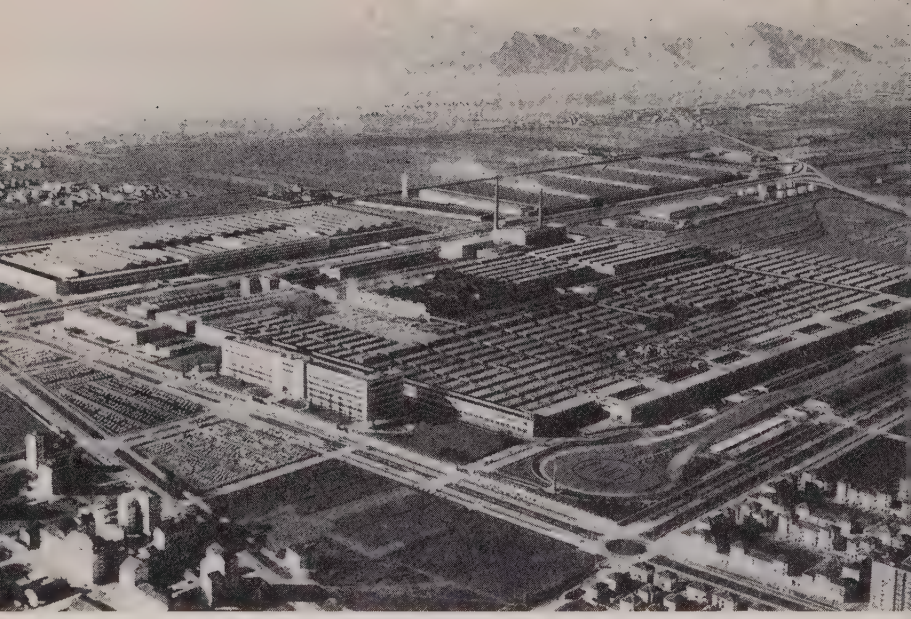


FIG. 124. FIAT MOTOR WORKS AT TURIN.

machines), while Milan also produces cars, aircraft, catering machinery, railway and electrical equipment and machine tools.

Milan is also the centre of the textile region which includes Biella and Como. The latter used to be famous for natural silk while Milan had cotton factories, but today all the textile factories are using synthetic fibres. As elsewhere in Europe, the chemical industry has increased in importance. There are electro-chemical works in the Alpine valleys and other works at Milan, Turin and Genoa. The old city of Ravenna has had a new lease of life since the largest synthetic rubber and fertiliser plant in Europe was built there; it uses natural gas as both raw material and fuel.

The dominant city of north Italy is Milan, with a population of 1·6 million. It is the financial and commercial capital of the country and a great route centre. It was a road centre, and later a railway centre, but today it stands out as a centre on which great motorways (*autostrada*) converge.

Genoa, with a population of 775,000, is the chief port of northern Italy. The rocky Mediterranean coast affords good harbours but level land is limited and the town climbs the steep hills behind.

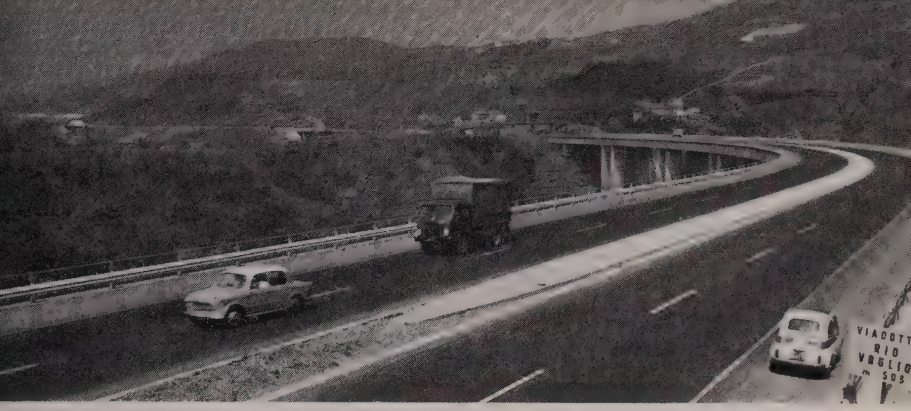


FIG. 125. AUTOSTRADA DEL SOLE CROSSING THE APENNINES.

Road, railway and oil pipelines across the Apennines to the Lombardy Plain and beyond (Fig. 80). As well as the iron and steel works there are modern oil refineries and engineering works. The eastern outlet of the Lombardy Plain is the unique city of Venice (population 336,000), built on islands in a lagoon but linked by road and rail causeway with the industrial suburb of Mestre on the mainland. No wheeled traffic is allowed on the islands which are a world-famous tourist attraction.

8. Draw a large sketch map of northern Italy and use it to summarise the information on industries.
9. Study Fig. 124.
   (*a*) Describe the setting of the works.
   (*b*) Why is Turin a good site for a modern motor works?
   (*c*) Draw a sketch showing the layout of the works indicating (i) roads, (ii) railway, (iii) water tower, (iv) oil storage, (v) power station, (vi) car park, (vii) residential areas.
10. (*a*) Why is there no port at the mouth of the River Po?
    (*b*) With what other European rivers can the Po be compared in this respect?
11. (*a*) Why is Genoa a more important port than Venice?
    (*b*) A large new cargo depot has been established 50 miles inland from Genoa. Explain this choice of site.
12. Many Italian firms are world famous. Can you name any other than the Fiat company?

One of the five autostrada which leave Milan is the Autostrada del Sole, designed to link the prosperous industrial north with the less developed south. Fig. 125 shows the carefully graded road

FIG. 126. SERCHIO VALLEY.

crossing the Apennines south of Bologna which lies beyond the left of the picture. It follows the Setta Valley keeping close to the contour. The bend shown in the picture is where the road crosses a tributary valley.

13. (*a*) Name the tributary: give the height above sea level in (i) metres, (ii) feet.
(*b*) In what direction is the lorry in the centre of the picture travelling?
(*c*) What is the next large town on its route? (Refer to your atlas.)
(*d*) A railway also crosses the Apennines in this area but it entered a tunnel further down the valley. Account for this.
(*e*) Compare this autostrada with a British motorway.
(*f*) Why has great engineering skill been necessary to construct this autostrada throughout its whole length?

The Apennines dominate the relief of peninsular Italy. In central Italy the crest of the range is nearer to the east coast than to the west. In Tuscany and Umbria there is an extensive area of

FIG. 127. SLOPES OF THE SERCHIO VALLEY.

hill country with many river valleys and basins where settlement and cultivation are possible. Fig. 126 shows a stretch of the Serchio Valley 13 miles above Lucca. The large village in the centre is Borgo a Morzanno, with Cerreto on the hillside above. Typical of the hill communities of central Italy, this area has been the scene of an experiment in technical assistance to try to increase the output from the farms by using improved methods. Farms are all small and held in scattered strips, six or eight plots being usual. Some farmers own their land but others are tenant farmers.

The woodland on the upper slopes is mainly chestnut and acacia which is cut for poles and fuel. The main crop is wheat, grown in rotation with maize and potatoes. Fodder crops are grown to feed cattle, pigs, horses and mules. Fig. 127 shows more detail of the hill-slopes between Borgo and Cerreto. The slopes are terraced for vineyards but also to extend the cultivation of crops. The farmers' income is mainly from the sale of wine and potatoes.

14. Draw a bar graph to illustrate the land use figures for the two settlements described above.

	hectares
Woodland	243
Cropland	102
Vines	29
Olives	26
Meadow and Pasture	20
Total	420

1 hectare = 2·47 acres

15. (*a*) Draw a sketch based on Fig. 126 showing (i) the river, (ii) the mountains, (iii) hilly land, (iv) plain, (v) the road, (vi) the railway, (vii) the bridge, (viii) the dam for hydro-electric power.
(*b*) Where is most of the cropland situated and why?
16. (*a*) What is the tree in the foreground of Fig. 126?
(*b*) Can you find examples of this tree in Fig. 127?
17. (*a*) Describe the village in Fig. 127.
(*b*) It is sometimes said that this is gardening rather than farming. Why?
(*c*) How are horses and mules used?
(*d*) In what way can the technical assistance programme change this?
(*e*) What are some of the difficulties in giving technical assistance in an area like this?

In the broader basins such as those near Assisi and Perugia, there is more level land with strips of wheat, maize, lucerne and sugar-beet separated by rows of vines. Near Rome the landscape is very different for one sees extensive wheat crops grown by wage labourers on large estates. Soil erosion is common on the loose clay and gravel soils, particularly where the land is sloping (Book 3, page 122). The eroded material carried down by rivers forms ill-drained lowlands. Some estates rear cattle, using the marshy lowlands for winter pasture and the Apennines for summer pasture. South of Rome is the area of the Pontine marshes, once grazing land but now drained and split up into individual farms. This landscape of eroded foothills and adjacent marshy lowlands is common throughout southern Italy too. The region of central Italy is world famous for its historic towns and cities which attract thousands of tourists every year. Some like Perugia, Assisi and Siena occupy attractive hill sites crowned by

FIG. 128. FLORENCE.

cathedrals, but Florence (Fig. 128), birthplace of the Italian Renaissance, grew up at a bridge point on the Arno. Its huge cathedral (*duomo*), with its black and white marble facings, dominates the city. Tourists who come to see its great art treasures are scarcely aware that the city is a market and industrial centre. Leather, jewellery, baskets, fashion and artistic products are made in the old town while wool textiles, engineering and chemical industries are found in the suburbs. Also in the Arno basin are Pisa, whose cathedral has the famous leaning tower, and Leghorn, the port for the region.

Rome, with a population of over a million, was chosen in the nineteenth century to be the capital of modern united Italy. It grew up on the left bank of the Tiber on 'seven hills' over 2,000 years ago and became the centre of the great Roman Empire. The building of roads and railways has helped to re-establish Rome as the capital, though it is far from being the main industrial area of the country. Its functions are mainly administrative and it is a great religious, cultural and tourist centre. There is some modern light industry in the eastern suburbs.

Industrial development in central Italy has been impeded by

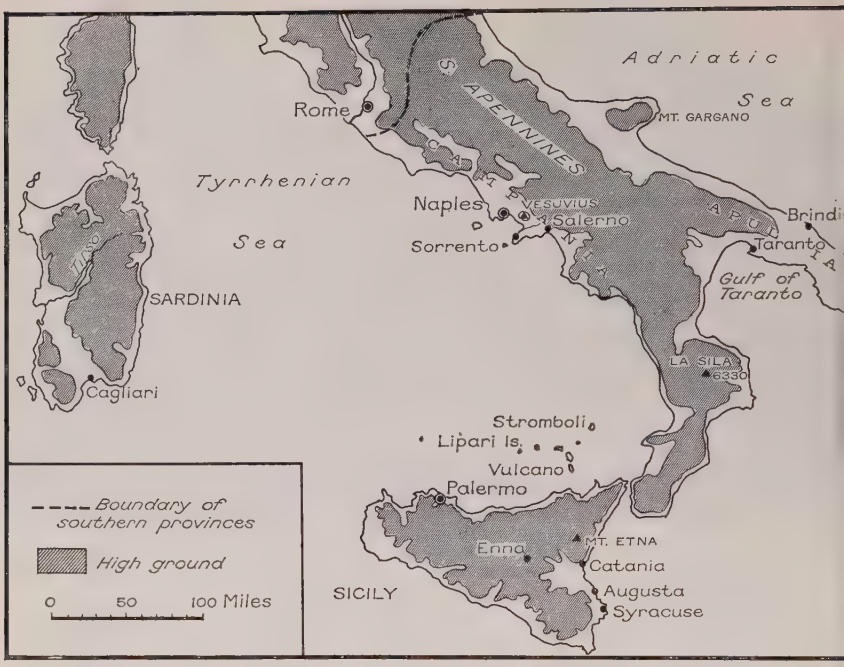


FIG. 129. ITALY. THE SOUTH.

lack of power and mineral resources. Terni has hydro-electric power and iron and steel, chemical and textile works have developed. Elba has iron ore which supplies the iron and steel works at Piombino on the adjacent mainland. Carrara has marble quarries that have long been important.

18. (*a*) Draw a sketch map of Central Italy showing: (i) the crest of the Apennines with selected heights; (ii) the rivers Arno and Tiber; (iii) the hill country of Tuscany and Umbria; (iv) places mentioned in the above account.
(*b*) In 1967, severe damage was inflicted on the art treasures of Florence by floods. Why are floods a danger in Florence while most other towns are safe?
(*c*) Milan has some of the functions of a capital city. Make a list of the advantages and disadvantages of Rome and Milan as a capital of Italy.

The Autostrada del Sole passes through the hills south-east of Rome from Latium into Campania, from central Italy to 'The

FIG. 130. REGALBUTO WITH MT. ETNA IN THE BACKGROUND.

South' which consists of peninsular Italy and the two large islands of Sicily and Sardinia (Fig. 129). 'The South' is 40 per cent. of the land area of Italy yet it has but 22 per cent. of the national income. The contrast in economic development between north and central Italy and the South is one of the most striking features of the geography of Italy. Physically the difference is not great, for the Apennines with their flanking basins and lowlands continued to the 'toe' of Italy and across into Sicily while Sardinia also has a central core of mountains. One major difference, however, is the occurrence of young volcanic rocks frequently associated with active volcanoes such as Vesuvius, which reaches 3,891 feet, and Etna in Sicily, which reaches 10,794 feet. Fig. 130 was taken along the main road from Catania to Enna, west-south-west of Regalbuto shown in the middle of the picture. Fig. 131 is a contour sketch of the site of the town above the ill-drained lowlands of the Salso river where formerly malaria was rife.

19. (*a*) Draw a sketch to show the shape of Mount Etna indicating (i) the main cone and subsidiary cones and (ii) the position of the snow line.
(*b*) Which side of the mountain is shown?
(*c*) Temperature falls 1° C every 540 feet. If it is 20° C at Regalbuto: (i) At what height is the snow line reached? (ii) What is the temperature at the top of the mountain?

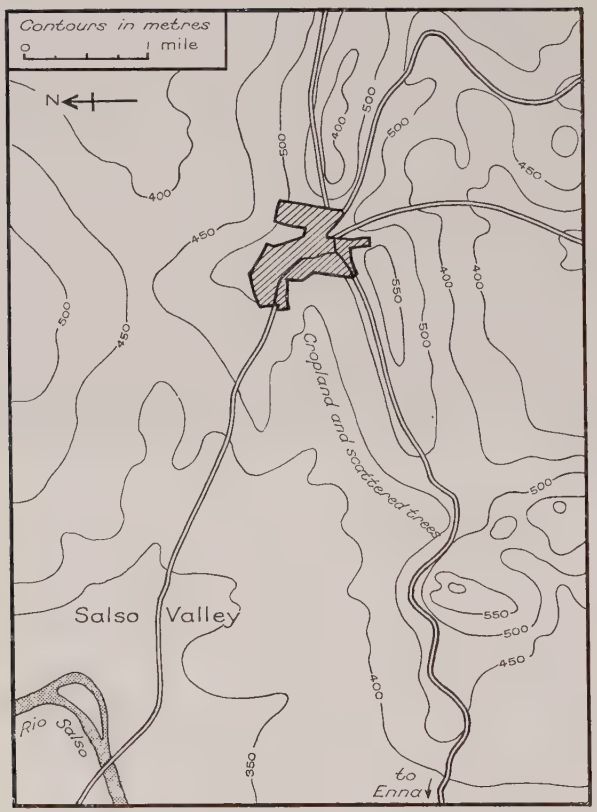


FIG. 131. THE SITE OF REGALBUTO.

20. Describe the countryside round Regalbuto. How far is it typically 'Mediterranean'?
21. Using Figs. 130 and 131 describe the site of Regalbuto.

Regalbuto is typical of the agricultural towns of 'The South' where the population may range from 4,000 to 14,000 and are separated by miles of uninhabited country. The people go down to work in the wheat fields of large estates often several miles away. As there is work on only a hundred days in the year, unemployment is a serious problem. To relieve the poverty, there has long been emigration to the Americas and other parts of Europe. Emigration to the U.S.A. is now severely restricted so the cities of northern Italy and the Common Market countries

are the main destination of emigrants today; in 1966, 90 per cent. of the work permits given within Common Market countries were to Italian workers mainly for work in West Germany.

A more positive policy to alleviate distress has been the setting up in 1950 of the *Cassa per il Mezzogiorno* (Fund for the South) which made government funds available for development. Improvements in agriculture go some way to meet the problem but a greater hope lies in the ability of the region to attract industry.

A typical area selected for agricultural redevelopment is the area of the Sila Massif in Calabria in the 'toe' of Italy. It involves $1\frac{1}{2}$ million acres and 400,000 people. Afforestation of eroded hillslopes, drainage of the marshy lowlands and improved transport are an essential part of the scheme. Large estates have been bought and split up into farms of fifteen acres. Use of the land is more intensive with beans and lucerne grown in rotation with cereals. Olive, vine and citrus fruits are also grown. Stall-fed cattle have taken the place of sheep and goats. The whole landscape has changed, for people now live in groups of new colour-washed houses set among the fields. Developments like this are affecting about 15 per cent. of the people of the South but they are hopeful pointers to the future. There is a similar scheme in the Tirso Valley in Sardinia.

It should be noted that there are some areas of successful specialist cultivation in the South. In Apulia, the heel of Italy, there are large estates which specialise in vine or olive cultivation. In the plain of Campania behind Naples there is intensive cultivation of fruit (apples, peaches, cherries) and vegetables, especially tomatoes, on the rich volcanic soils. In the Sorrento peninsula south of Naples and round the coastal plains of Sicily and Calabria are groves of oranges and lemons. General cultivation of such citrus fruits is possible only in the South as they are susceptible to frost. Fig. 132 shows an orange grove on the Sorrento peninsula towards the northern limit. Mats are spread out over the top of the groves as frost protection. The small huts are to store the mats when not in use.

22. (*a*) Suggest why the people of Regalbuto do not live amongst the fields?

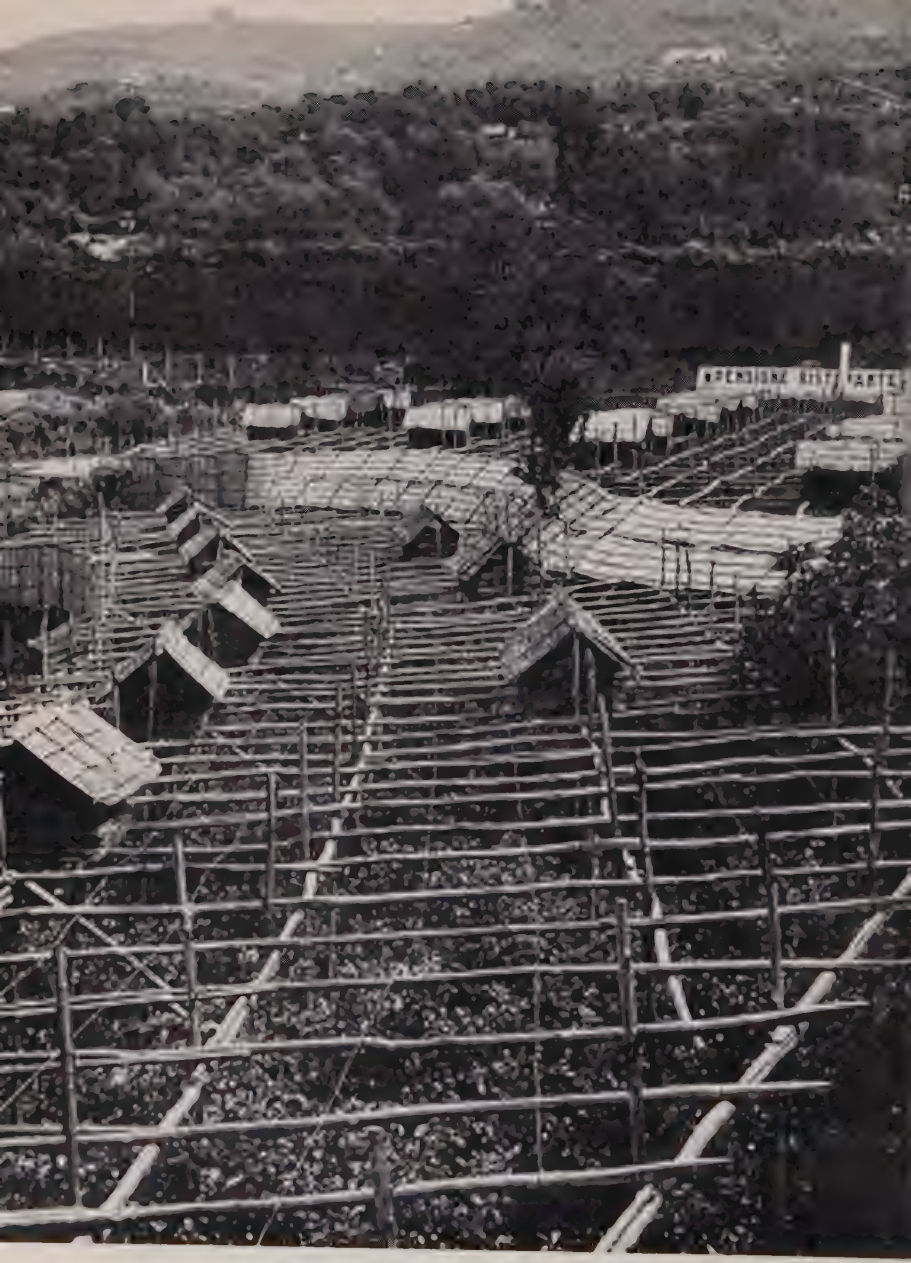


FIG. 132. AN ORANGE GROVE NEAR SORRENTO.

(*b*) Winter wheat is the chief crop of the South. At what times of year will the agricultural labourers be needed?
(*c*) Why are the coastlands of South Italy and Sicily sometimes called 'the golden girdle'?
(*d*) Draw a sketch map to show the areas of specialist cultivation in 'the South'.

23. All peninsular Italy has a Mediterranean climate but there is a gradual change from north to south as shown in the figures for Florence and Palermo.

FLORENCE	*J.*	*F.*	*M.*	*A*	*M.*	*J*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	6	7	10	14	18	21	25	24	21	16	10	7	
Rainfall ins.	3·6	4·0	2·1	2·5	2·7	2·0	1·3	1·2	3·7	5·1	4·6	3·4	36·2
PALERMO													
Temp. °C	11	12	14	16	21	23	26	27	24	20	16	13	
Rainfall ins.	5·0	3·6	2·6	1·7	0·8	0·2	0·1	1·6	1·2	3·7	3·9	3·5	27·9

(*a*) What do you notice about the amount and distribution of rainfall at each of these places?
(*b*) Comment on the difference between the January and July temperatures.

Until recently industry was concerned with processing agricultural products or confined to the ports, particularly Naples, which has a population of over 1 million. Shipbuilding, engineering, chemical and textile industries are found there as well as modern oil refineries. Nevertheless thousands of people are unemployed and there is poverty of a degree rarely seen in Europe. Palermo, the chief port of Sicily, has a chronic poverty problem which has been highlighted in the work of the reformer Danielo Dolci. Shortage of power and the reluctance of industrialists to invest in the South are the main causes. However, oil has recently been discovered in Sicily giving rise to spectacular new developments:

> A stretch of coast between Syracuse and Augusta in eastern Sicily, where the Greek city of Megara is believed to have been, and where until lately there were only contorted olive trees and flocks of sheep grazing in front of a wine dark sea, now looks like Newark, New Jersey or Galveston, Texas, the plains crammed with chemical factories, aerial tanks, yellow, red and blue pipes and intricate metal structures rising in the sky.[1]

Taranto has been chosen as the site of a new iron and steel works which is expected to produce $4\frac{1}{2}$ million tons of pig iron

[1] Barzini Luigi, *The Italians*, Hamish Hamilton, p. 247.

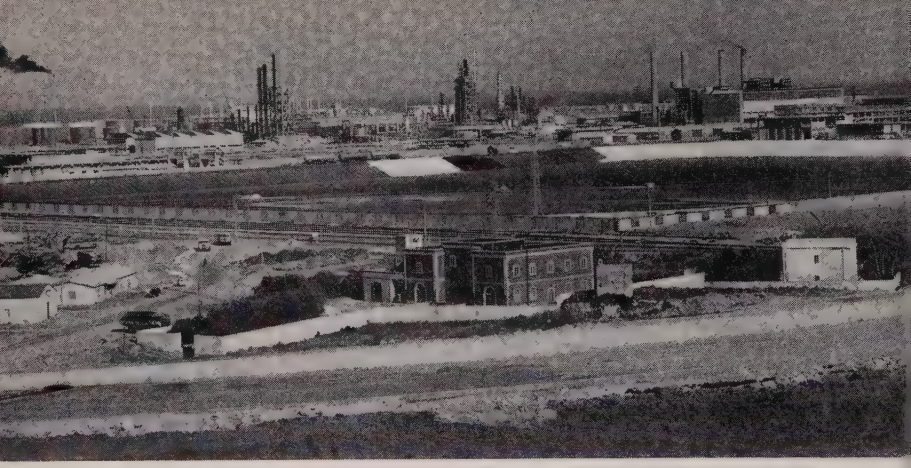


FIG. 133. A CHEMICAL WORKS AT BRINDISI.

and over 5 million tons of steel. A discovery of natural gas farther inland should stimulate further development.

Many firms with headquarters in north Italy have been persuaded to set up branches in the South, for example: a woollen mill at Maratea, south of Salerno employing 1,200 people, a typewriter factory and engineering near Naples, chemicals and oil refineries at Brindisi (Fig. 133), telephones and even aircraft.

An important source of income in many parts of Italy is the tourist industry. The Naples area and parts of Sicily profit from this and the completion of the Autostrada del Sole will bring tourists to the attractive coastal and mountain scenery which lie between. It is hoped that this highway will also be an effective economic link bringing greater unity to the country.

24. Draw two columns headed Lombardy Plain and The South. Summarize what you have learned under the headings—Population, Agriculture, Industry.

The Iberian Peninsula: (1) Portugal

The Iberian peninsula is much more compact than Italy and has a long coastline facing the Atlantic Ocean as well as a Mediterranean coastline.

Portugal occupies most of the western side of the peninsula (Fig. 134). Fig. 135 shows a typical scene in the northern part of the country. The boulders in the foreground are of granite which

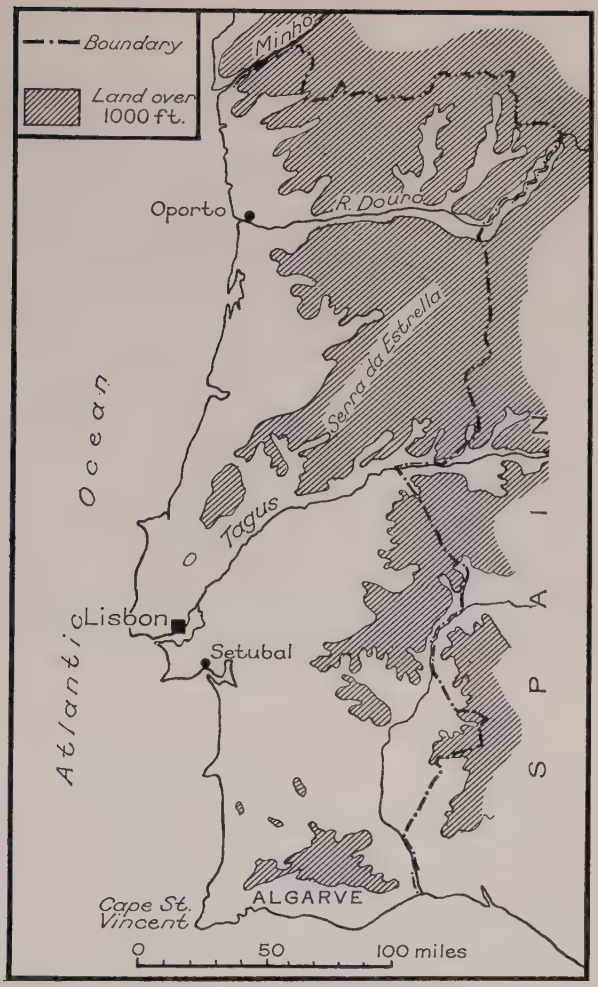


FIG. 134.
PORTUGAL.

forms the hills rising to 2,500 feet. Settlement and cultivation occur in the deeply cut valleys. Open to westerly winds from the Atlantic, the rainfall of 50 inches to 100 inches is greater than is usual for Mediterranean lands. Fig. 136 shows a more detailed farming scene taken in early summer. The land is being ploughed in preparation for the sowing of maize, the chief crop. Behind, a winter cereal is ready for harvest. Potatoes, vegetables, fruit and

FIG. 135. A LANDSCAPE IN NORTH PORTUGAL (MIN-HO).

vines are also important crops. Cattle are kept for meat, milk and are used as draught animals. Sheep and goats are reared on the hills while pigs and poultry are found near the farm buildings. Farms are usually under fifteen acres and many are below five acres.

Fig. 137 shows a scene on the slopes of the Douro Valley where vines are grown to produce port wine. The terraced vineyards are on a metamorphic rock called *schist*. It weathers into a stony soil which reflects the heat and helps in ripening the grapes. The grapes are taken to the presses where they are trodden under foot and the wine is sent down the valley to the wine lodges of Oporto before being exported mainly to Britain and France.

25. (*a*) What is the latitude of north Portugal?
    (*b*) What part of Italy is in this latitude?
26. (*a*) Draw a sketch to show the main features of Fig. 135.

FIG. 136. FARMING IN NORTH PORTUGAL.

FIG. 137. PORT WINE VINEYARDS.

(*b*) What is the main species of tree in the forests? (see Fig. 136).
(*c*) Why is terracing necessary in this area?
(*d*) Comment on the methods used in Fig. 136.

27. (*a*) Emigration to South America is common from north Portugal. Suggest why.
(*b*) Meat, milk, wine and timber are the main products sold by the farmers. Name other products which are for the farmers' own use.
(*c*) Although the total rainfall is heavy, irrigation is sometimes needed in June, July and August. Why?

28. (*a*) (i) Describe the scene in Fig. 137. Note the outcrops of schist. (ii) What are the scattered trees shown in the picture?
(*b*) Suggest a possible method of transporting the wine down to Oporto.

Wheat, maize, vines, olives and fruit are grown throughout Portugal. On the extensive lowlands of the Tagus Valley there are pastures for cattle rearing and irrigated rice is grown. The southern part of Portugal offers many contrasts with the north, as the following description shows:

> Among the northern mountains, under forests of pine and between the great groves of chestnuts, grow bracken, heather and foxgloves; mists cling to the slopes, streams run down the glens—except for the vines wreathing the slender oaks and poplars, and the ox carts creaking along the narrow roads, one might fancy oneself in Scotland. Down in the south no such illusion is possible: the sun beats down in African heat and splendour on the great rolling sweeps of brown soil, set thickly with the shapely dark green of the cork oaks league after league; cattle and pigs cluster round troughs at the wells for the water swung up by a bucket at the end of a weighted pole or wound up by a blindfold mule or donkey, walking endlessly in his small circle; the great fig trees squatting on the ground like broody hens, a pattern in their greenness, the fragile almond trees, the agaves and the cactuses along the road sides—all these remind the traveller, not of Europe at all, but of Asia Minor or Morocco.[1]

Fig. 138 shows the cork oak tree which is 30 to 40 feet tall and has a thick spongy bark to help it to conserve moisture. The trees are stripped every 8 to 10 years, when they have reached maturity. Some is exported in the crude state but there are 500 small factories which process the cork for a variety of purposes including the manufacture of insulating material.

[1] Ann Bridge, *Portugal*, p. 19.

FIG. 138. CORK OAK TREES.

29. (*a*) What is the latitude of southern Portugal?
(*b*) What is the difference in latitude between north and south Portugal?
(*c*) What suggests that southern Portugal is a dry land?
(*d*) List the plants mentioned in the passage which do not grow in northern Portugal.
(*e*) (i) What animals are mentioned and (ii) how are they used?
(*f*) Which season of the year is the season of drought?
30. (*a*) Describe carefully how the bark is stripped from the tree.
(*b*) What important Portugese industry uses much cork?
(*c*) Make a list of other uses of cork.

With the long Atlantic coastline, it is not surprising to find that fishing is an important occupation. Of the many small fishing ports round the coast, Setubal, south of Lisbon, is the most important. As many as 600 sardine boats go out at night in summer, returning the next day with their catch about half of which is canned for export. Anchovies, tunny fish and shell fish are also important. Cod fishing boats still make the long journey to the Grand Banks of Newfoundland and dried cod is an important item in the Portuguese diet.

The Portuguese, like the Norwegians, have a long tradition of seafaring. Portuguese sailors were the first to sail round Africa and to discover the sea route to India. They built up a colonial empire in Brazil and Africa and there is still considerable emigration to these places even though Brazil is now an independent country.

Portugal is poor in power resources and minerals so industry is largely confined to rural crafts and processing of agricultural products. However, three hydro-electric power stations have been constructed along the Douro river and an iron and steel works has been set up at Seixal across the Tagus from Lisbon: coke from U.S.A. and imported ore are the raw materials.

Lisbon, the capital city, has a population of about 800,000. It is also the chief port and an important port of call en route from Europe to South America.

31. (*a*) Which other part of Europe has fisheries similar to those of Portugal?
(*b*) What oil is available for use in the canneries?
32. (*a*) Find out about the work of Prince Henry the Navigator.
(*b*) Look at a political map of Africa and name the Portuguese territories.

33. Make a list of the processing industries of Portugal.
34. Draw a large sketch map of Portugal to summarise the geographical facts in this chapter.

(2) Spain

Spain with a population of 31 million, over three times that of Portugal, occupies five-sixths of the Iberian Peninsula. Even more than in Portugal, there is a strong contrast between the north and the south.

35. (*a*) What is the latitude of the Straits of Gibraltar and the north coast of Spain?
(*b*) Through how many degrees of latitude does Spain extend?
(*c*) Compare this latitudinal extent with that of Portugal.

LA CORUNA	*J.*	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	10	10	11	12	14	17	18	19	18	15	18	10	
Rainfall ins.	4·4	3·3	3·4	3·2	2·2	1·5	1·3	1·7	2·5	3·9	4·5	5·2	37·1
SEVILLE													
Temp. °C	10	12	14	17	20	24	27	28	24	22	14	11	
Rainfall ins.	2·2	2·9	3·3	2·3	1·3	0·9	0·1	0·1	1·1	2·6	3·7	2·8	23·3

(*d*) What is the difference between La Coruña and Seville in (i) January temperature, (ii) July temperature, (iii) total rainfall, (iv) distribution of rainfall?
(*e*) Which of these two places has a true Mediterranean climate?
(*f*) What is an appropriate title for the other climate?

The far north-west of Spain, called Galicia, consists of a granite mass reaching to a height of over 5,000 feet. To the east are the Cantabrian mountains, rising to over 8,000 feet, which separate the north coastal regions from Central Spain. In the valleys and along the coastal plains farming is important, with maize as the chief cereal. There is some wheat and barley in the drier parts. Other crops are potatoes, beans, sugar-beet and fodder crops. Cattle rearing is widespread, the north being Spain's chief meat-producing region. Farms are small and do not provide an adequate living for the people. The *ria coast* has many sheltered harbours so fishing has long been important. Sardines, tunny and anchovies are caught in local waters and cod from as far as Newfoundland. Vigo, La Coruña and Santander are the chief fishing ports, the former accounting for half the preserved fish of Spain.

The north coast is also an important industrial region of Spain, as most of her annual production of 14 million tons of coal and 5

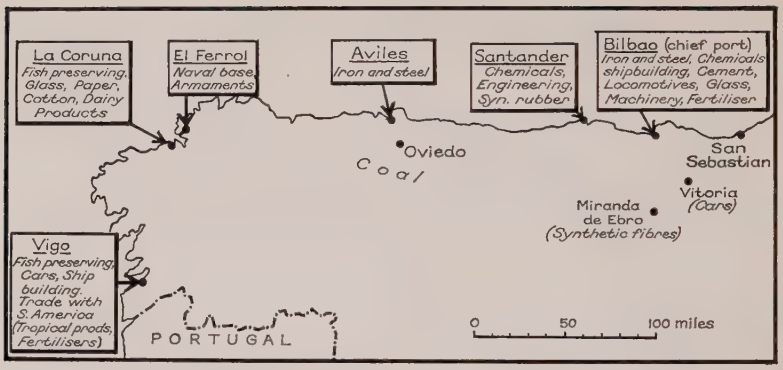
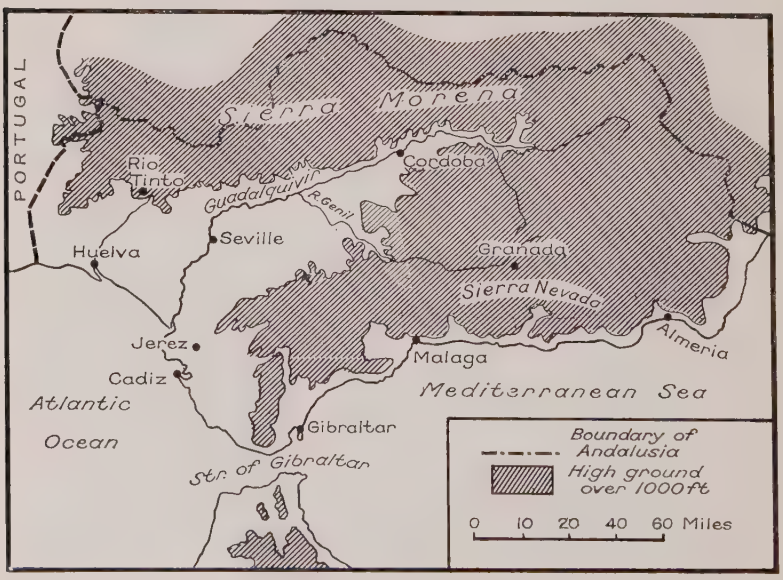


FIG. 139. INDUSTRIAL MAP OF NORTH SPAIN.

million tons of iron ore are found here and there is hydro-electric power from the mountains. Fig. 139 shows the chief towns, most of which are ports, Bilbao being a major port.

Although steel production reached 3·3 million tons in 1966 2·3 million tons were imported to meet the country's needs.

FIG. 140. ANDALUSIA.



36. (*a*) (i) Which places have iron and steel industries and (ii) what is the particular local advantage of each?
(*b*) Compare the coal and iron output of Spain with that of the Industrial Triangle (Chapter IV).
(*c*) What part of France does Galicia resemble? Make a comparison of the two regions under headings of (i) Relief, (ii) Climate, (iii) Occupations.

The eastern part of this region, round the western end of the Pyrenees astride the French frontier, is the Basque country. The Basques are a distinctive people with their own language and customs which have been preserved for centuries.

The sketch map (Fig. 140) shows Andalusia which contrasts strongly with northern Spain. In the valley of the Guadalquivir and its tributaries there is level land for cultivation but between the rivers there is much dry grassland country which can only be made productive by irrigation. As in south Italy and Sicily there are large estates (*haciendas*). Fig. 141 shows part of a 4,000-acre hacienda owned by a family who live most of the year in Seville, which lies 20 miles to the north. It is managed by a foreman who is helped by four men who live on the estate with their families. They look after the animals (mules and pigs), equipment and the orchard and gardens. Thirty-five day labourers from the near-by village are regularly employed but as many as a hundred are needed for harvests. Most of the produce is sold in Seville.

Olives are the chief crop, for this hacienda is in the heart of the chief olive-growing area in Spain and Spain is the world's chief producer of olives. Much care and attention is needed to produce

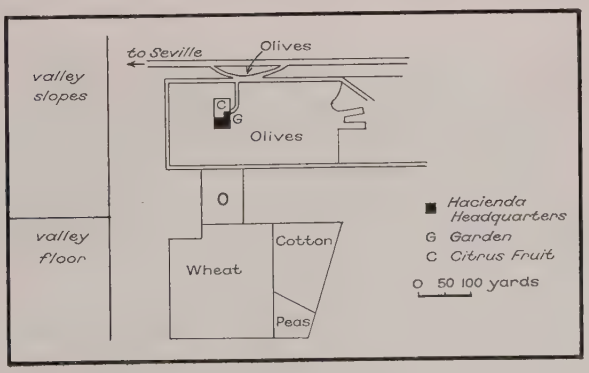


FIG. 141. PLAN OF A HACIENDA.

FIG. 142. OLIVE HARVEST.

high-quality olives for both table use and for oil. The former are picked when green and the latter are picked in December when fully ripe and black in colour. The calendar of work in the olive groves is as follows:

Jan.	Fertilising	Pruning
Feb.	↓	Spraying
March	Grafting	↓
April	Flowering	
May	Fruit forms	
June		
July		
Aug.	Harvest	
Sept.	↓	
Oct.		
Nov.		
Dec.		

Fig. 142 shows a scene at harvest time. The baskets of olives are brought to be graded by passing them through a wire grid. They are then sent for processing to the near-by village.

37. (*a*) What is the area devoted to each of the farm crops?
(*b*) Account for the layout of the hacienda.
(*c*) Wheat, cotton and Spanish peas fit in well with cultivation of olives. Copy the table above into your exercise book and complete it to show when the planting and harvesting of the field crops takes place (refer to Chapter I).
38. (*a*) What is the main form of transport in the olive groves?
(*b*) There is considerable under-employment in the area. (i) Why is this? (ii) With what other country can this be compared?

This hacienda has a small orange grove but no vineyard. Oranges and vines are cultivated widely in Andalusia, the Seville oranges for making marmalade being world famous. In the region of Jerez La Frontera are the vineyards from which sherry is made. Other crops grown include sugar-cane, sugar-beet, tobacco, flax and hemp, while cork oak trees flourish in the coastal areas. Sheep are reared on the dry grasslands but Andalusia is too dry for dairy cattle though bulls are reared to satisfy the needs of the national

FIG. 143. SIERRA NEVADA NEAR GRANADA.

sport of bull-fighting. The planned extension of irrigation works will greatly increase the productivity of this region. Fig. 143 shows the olive-clad lower slopes of the Sierra Nevada near Granada.

Beyond the Sierra Nevada is the south coast of Spain which, unlike the Guadalquivir Valley, does not receive rain-bearing winds from the Atlantic in winter. Almeria, with a rainfall of only 8 inches, has a weather station for the study of desert conditions. Where irrigation water is available there is typical Mediterranean cultivation. Fig. 144 shows a typical *arid landscape* where esparto grass has been cut for export as it is an important raw material in the paper industry.

39. (*a*) Describe the distant peaks in Fig. 143.
    (*b*) What advantage has this for irrigation?
    (*c*) What is the meaning of Sierra Nevada?
    (*d*) Find out from your atlas the height of these mountains.
40. Make a list of the features in Fig. 144 which are typical of an arid landscape.

From the seventh to the fifteenth century this part of Spain was ruled by the Moors, Moslem conquerors from North Africa (see Book 2, page 3). Their influence can be seen in the architecture of

FIG. 144. AN ARID LANDSCAPE NEAR ALMERIA.

FIG. 145. A LANDSCAPE IN THE HUERTA OF MURCIA.

the cities, particularly at Granada where there is the famous palace called the Alhambra. Seville, with a population of nearly half a million, is the fourth city of Spain. It is linked to the sea by a canal and is thus a port as well as a market centre. Wine, cork and olive oil are the chief exports while coal, machinery, textiles and chemicals are imported. Its industries are increasing, especially cotton textiles and engineering. Cadiz and Huelva are ancient ports which also carry on fishing for sardine and tunny. It was from Cadiz that Columbus sailed for America in 1492 thus opening up Spain's long connection with America. Huelva is the outlet for the Rio Tinto copper mines. Gibraltar, the limestone rock commanding the narrow entrance to the Mediterranean, has been a British colony and naval base since 1713 but Spain is pressing for its return.

The *south-east coastlands* of Spain consist of several extensive lowlands separated by mountains. Each of the relatively short rivers which descend to the coast is used to irrigate an area known as a *huerta*, in which a variety of crops is intensively cultivated. Fig. 145 shows part of the densely peopled huerta of Murcia. The

closely packed trees are mainly orange groves but peaches, apricots and almonds are also grown and the pattern of irrigation channels can be seen amongst the fields. Farms are very small, one or two acres being common, but two crops a year are often obtained, maize in the summer and potatoes in the winter as well as a variety of vegetables (tomatoes, beans, melons, peppers, onions) which are worked into an intricate rotation. Similar cultivation can be seen in the huerta of Valencia where there is also rice-growing along the coast. At Elche date palms give an African touch to the landscape.

41. (*a*) In Fig. 145 contrast the hill and valley lands.
(*b*) (i) Where are most of the houses situated? (ii) Does the area seem to be densely or sparsely populated?
(*c*) Draw a sketch of the huerta from the picture.

Modern developments in this area include an oil refinery at Cartagena which also receives natural gas from Algeria. It has shipbuilding and engineering industries. Valencia, Spain's third city with a population of over half a million exports agricultural produce, especially oranges and nuts, and has textile, engineering, chemical, paper and furniture industries.

Beyond the delta of the Ebro is Catalonia. With a rainfall of less than twenty inches falling mainly in the winter, agriculture is typically Mediterranean (Chapter I). It is also an industrial region using power from the Pyrenees. Textiles using both natural and synthetic fibres are the chief industry but in Barcelona, Spain's second city and chief port with a population approaching two million there is great variety: iron and steel, engineering, chemicals, leather, cement, porcelain, cars and aircraft. Taragona has a modern oil refinery. The Catalan coast, part of which is known as the Costa Brava, is also Spain's chief tourist area. In 1967 over 17 million people visited Spain, attracted amongst other things by the favourable exchange rate.

On the surface, Catalonia does not have the appearance of an industrial area. Inland rise the green grass-covered hills of the Pyrenean foothills, spoilt by neither slag-heaps nor chimneys, and the littoral retains its distinctive Mediterranean colour and charm. Industry is in fact widespread but unobtrusive. In most towns and villages there are a few tall chimneys, and hooters blow regularly.

This working to time, and general appearance of bustle, the number of bicycles seen in the streets, and the fact that people here seem to make a better living than most Spaniards, all combine to give an atmosphere alien to the rest of Spain.[1]

42. (*a*) Describe (i) the landscape; (ii) the distribution of industry.
(*b*) How does Catalonia differ from (i) industrial regions located on coalfields; (ii) other parts of Spain?
(*c*) Little water from Catalan rivers reaches the sea. Suggest two reasons for this.

43. (*a*) Collect travel brochures on Spain and list the advantages for holiday makers from Britain.
(*b*) What areas other than the Costa Brava attract tourists both on the mainland and the islands?

The productive regions of Spain which we have studied lie round the margins of the country, while the capital, Madrid, lies in the centre. The interior is occupied by a series of high plateaux known as the *Mesetas* with more resistant rocks forming ridges (*cordilleras*) above the general level.

44. (*a*) What is the average height of the plateau?
(*b*) What suggests that it is tilted to the west?
(*c*) What are the names of the main ridges?
(*d*) In what main direction do they trend?

MADRID

	J.	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	5	6	9	12	16	20	23	23	19	14	8	5	
Rainfall ins.	1·1	1·7	1·7	1·7	1·5	1·2	0·4	0·3	1·2	1·9	2·2	1·6	16·5

45. (*a*) Make a graph to show the temperature and rainfall figures for Madrid.
(*b*) Compare these figures with those for La Coruna and Seville, noting the differences in (i) January temperature, (ii) July temperature, (iii) amount of rainfall, (iv) distribution of rainfall.

Much of the Mesetas are arid and scenes such as Fig. 144 are common. On the higher, drier parts large flocks of sheep are reared and to avoid the summer heat they are taken to mountain pastures in the Pyrenees or Sierra Nevada. The long journey on foot over the hot, dusty plains has now been replaced by rail or road transport. In the lower basins and river valleys wheat is the dominant crop stretching for miles. Yields, however, are poor for

[1] R. Way, *A Geography of Spain and Portugal*, Methuen, p. 232.

FIG. 146. IRRIGATED LANDS IN SPAIN.

methods are still primitive in most parts. As in southern Italy, the people live in large villages and often travel considerable distances to work. Vines and olives play their part in the farming system. Where irrigation is practised, maize, sugar-beet and fodder crops can be grown with cotton and tobacco farther south. Efforts are being made to extend the irrigated areas which cover 5 million acres, more than double the area of 1939 and to extend the use of machinery, fertilisers, improved seeds and livestock. The huertas which are a feature of the south-east coastlands are spreading throughout central Spain (Fig. 146).

Towns in the Mesetas are few and far between, only Valladolid, Badajoz, and Saragossa having more than 100,000 people. They are historic towns which are market centres with such industries as food processing and the making of machinery. Valladolid has a car factory. Shortage of power resources inhibits the development of large-scale industries. However, hydro-electric power is being

FIG. 147. PART OF MADRID.

developed in connection with irrigation schemes and oil pipelines lead from the coastal refineries to Saragossa, and Puertollasa, near the centre of Spain which has a large oil refinery. Although mineral deposits, iron, lead, copper and tin are widespread, there are no really rich deposits left to exploit and output is declining.

Madrid, the capital city, now has a population of 2·8 million. It was a small town on the River Manzanares (Fig. 147) when Philip II chose it for his capital. It is now linked by modern transport, rail, road and air to the richer regions round the margins. It has all the functions of a capital city and has developed a variety of industries. Iron and steel, machinery, railway equipment, lorries, aircraft, chemical, glass, textiles, paper and printing are among the most important.

46. (*a*) Study Fig. 146. Why does the North have the lowest acreage? (*b*) 'The extension of irrigation leads to a redistribution of population.' Why is this?

47. (*a*) Write a description of the picture of Madrid (Fig. 147).
(*b*) The river is much less important than the Seine or the Thames. Suggest why.

By Western European standards Spain is a poor country which has difficulty in supporting a population of over 30 million. Emigration has long been a solution. The former Spanish colonies in South and Central America are now the destination of less than 20 per cent. while other European countries take over 80 per cent. Many go for short periods only. The future of the country depends on its capacity to provide employment opportunities at home in improved agriculture, modern industry and the flourishing tourist trade. Much progress has been made as the following table shows:

	1935		*1965*	
Population	24·6 million		32 million	
Irrigated area	0·6 ,,	hectares	1·7 ,,	hectares
Wheat	3·5 ,,	tons	4·2 ,,	tons
Sugar-beet	1·5 ,,	,,	3·3 ,,	,,
Coal	7·2 ,,	,,	16·0 ,,	,,
Iron ore	2·0 ,,	,,	2·8 ,,	,,
Steel	0·6 ,,	,,	3·5 ,,	,,
Cement	1·1 ,,	,,	10·6 ,,	,,
Refined petrol	0·37 ,,	,,	14·4 ,,	,,
Fish	0·4 ,,	,,	1·2 ,,	,,
Barrages	104		316	
Electricity	3,272 m.kw. hrs.		31,650 m.kw. hrs.	
Merchant ships	951		2,439	

1 hectare = 2·47 acres.

48. (*a*) Work out the percentage increase in each case.
(*b*) Arrange in order of increase.
49. Draw a sketch map to show the main regions of Spain and indicate the chief towns.

The Balkan Peninsula

This is the third peninsula of Southern Europe: parts of it have already been studied in Chapter I (Greece) and Chapter II (Bulgaria). The northern boundary is the River Danube with its tributary the Sava, beyond which lie the Hungarian Plains.

It is the part of Europe farthest away from Britain. Tourists

can get there by road, rail, sea or air. The famous Orient Express route which linked Western Europe with Istanbul passed through this peninsula. It has now been replaced by the Direct Orient which leaves Paris just before midnight for Athens and Istanbul. Below is an extract from the time-table:

London	15.30
Paris	23.50
Lausanne	07.00
Milan	12.23
Venice	17.05
Trieste	19.52
Ljubljana	00.25
Zagreb	03.10
Belgrade	09.00
Sofia	18.25
Plovdiv	22.00
Istanbul	12.30
Skoplje	17.22
Thessaloniki	01.55
Athens	11.42

50. (*a*) If a traveller leaves London at 15.30 on Monday on what day will he reach his destination?
(*b*) Which is the shorter journey and by how much, Athens or Istanbul?
(*c*) (i) Name the countries through which the train passes and (ii) mention the regions you have already studied.
(*d*) Which Alpine pass is used?
(*e*) Which parts of the journey are covered at night?
(*f*) Draw a sketch map of the route showing the time of arrival at each place.
(*g*) Why is this route less important than it was 50 years ago?

Between Venice and Trieste, the train enters the Balkan peninsula in Yugoslavia, the land of the South Slavs. 19 million Slav-speaking people are united in this Federation of People's Republics. Within the boundaries of this large country are very varied landscapes. Between Trieste and Zagreb the train passes through Slovenia, an Alpine region similar to the neighbouring parts of Austria, while between Zagreb and Belgrade the line follows the lowlands of the Sava Valley. Between Belgrade and

FIG. 148. MAKARSKA ON THE DALMATIAN COAST.

the end of the journey are extensive mountain ranges which the railway penetrates by means of important river valleys. Many of the tourists who visit Yugoslavia go by boat along the beautiful Dalmatian coast facing the Adriatic, visiting the attractive ancient ports such as Split and Dubrovnik. Fig. 148 shows one such port of call, Makarska. The steep mountains which rise behind are the limestone Dinaric Alps forming a 60-mile-wide belt called the Karst. Communication with the rest of the country is difficult as there are few valleys and only one large river, the Neretva, reaches the sea along this coast. Fig. 149 shows the road which follows it. A new highway links the rapidly developing tourist resorts along this coast.

51. (*a*) From your atlas make a list of the provinces which make up Yugoslavia.
(*b*) Name the rivers which are followed by the railway through the Balkan mountains.
(*c*) What height are the highest parts of the mountains in Yugoslavia.

FIG. 149. THE NERETVA VALLEY.

52. (*a*) The Dalmatian coast is a typical 'coastline of submergence'. Describe it and say how it was formed.

(*b*) Draw a sketch of Fig. 148 noting especially the junction between the slopes of bare rock and the lower slopes formed of weathered material.

(*c*) Suggest why the Neretva is the only large river which reaches the sea.

SENJ	*J.*	*F.*	*M.*	*A.*	*M.*	*J.*	*J.*	*A.*	*S.*	*O.*	*N.*	*D.*	*Total*
Temp. °C	5	5	9	13	18	20	25	24	20	16	12	6	
Rainfall ins.	3·7	2·6	3·2	4·0	4·6	4·7	3·1	2·2	5·8	8·4	7·5	4·4	54·2

(*d*) (i) Draw a temperature and rainfall graph of Senj. (ii) How far is it a typical Mediterranean climate?

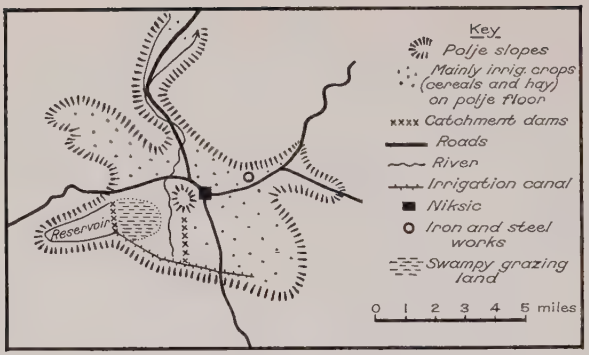


FIG. 150. NICKSIC POLJE.

A cold wind called the Bora sweeps down from the mountains in the winter sometimes causing ice to form on the decks of ships in Senj harbour. With such a variety of landscapes, it is not surprising to find that many types of farming are carried on. About 80 per cent. of the land is still farmed by individual peasants though there is usually some co-operative organisation for the purchase of fertilisers, seeds and implements and for the marketing of produce. Along the Dalmatian coast, farmland surrounds the grey stone villages with wheat, vegetables, fodder crops and orchards on the relatively level land. In Fig. 148 vineyards can be seen on the slopes. Cattle and sheep graze on the mountain pastures. The Karst country has vast exposures of bare grey limestone pitted with hollows called *dolines* and *poljes*. Some of these contain good deposits of soil and if water is available, agriculture is possible. Poljes which are larger than dolines may be many square miles in extent and contain several villages.

Fig. 150 shows the Nicksic polje.

53. (*a*) Estimate the area of the polje.
(*b*) Describe the slopes of the polje, the course of the river and the irrigation system.
(*c*) Account for the position of the main town.
(*d*) Describe the communications.

Beyond the Karst, the mountains are of impermeable rock which gives rise to a normal network of streams. In their valleys live most of the peasants of Yugoslavia. Villages are often built of timber cut from the deciduous forests of the mountain slopes.

Maize is the chief crop followed by potatoes, wheat, barley and fodder crops for the animals (cattle, sheep and pigs). Plum orchards are widespread. In Macedonia in the far south vines, tobacco, cotton and even rice are grown in the Vardar Valley

FIG. 151. YUGOSLAVIA. POWER AND MINERAL RESOURCES.

where there are some collective farms. Most collective farms are on the plains to the north which are continuous with the Hungarian Plains. One of these is 4,000 acres in extent and divided into 40 large fields. It is highly mechanised and entirely arable producing huge crops of wheat, maize and sugar-beet. The 100 men employed on this farm are far fewer than were needed in the days of hand labour. This releases many men to work in factories in

near-by towns, producing the machinery and fertilisers needed in modern farms.

As in all developing countries there is a movement of people from the countryside into the towns to work in the growing industries. Industrial production has more than doubled since 1947. Fig. 151 summarises the power and mineral resources of the country. Coal is still more important than hydro-electricity as a source of power but large new power stations are being constructed, those at Jablonica on the Neretva and on the Cetina river near Split being the greatest. Other modern developments are the construction of the state steel works at Zenica connected by rail to a new port Kardeljevo at the mouth of the Neretva, and the modern iron and steel, engineering and chemical works at Skoplje.

54. (*a*) Suggest why hydro-electric power is likely to become the country's chief source of power.
(*b*) What parts have good resources?
(*c*) Where are (i) the coal and (ii) the oil deposits of the country?
(*d*) Where are iron ore deposits found?
(*e*) Name the towns which have (i) iron and steel works; (ii) engineering.
(*f*) Where is bauxite found and for what is it used?
(*g*) What other mineral resources are there?

The chief industrial town is Belgrade, the capital, with a population of over half a million. It owes its importance to its command of important routeways. Zagreb, Sarajevo, Titograd and Skoplje are important provincial capitals with a variety of industries including engineering and textiles.

Although Yugoslavia is a Communist country, she is not a member of COMENCON (Chapter II) and is not closely linked economically with Russia. Trade with the countries of Western Europe and the Americas is important. Meat and timber products, fruit and minerals are the chief exports while machinery and transport equipment, chemicals, oil, cotton and manufactured goods are imported. Rijeka, which has been reconstructed, is developing into an important Mediterranean port, Yugoslavia's chief outlet to the west. Port industries such as shipbuilding and oil refining have grown up here.

FIG. 152. AERIAL VIEW OF ATHENS.

Greece

From Skoplje, the railway follows the Vardar valley which crosses the frontier into Greek Macedonia where Thessaloniki, with a population of 373,000, is the chief town and port. South of Thessaloniki the railway keeps near the coast, passing between the famous Mount Olympus and the sea. Between here and Athens it runs through several plains such as the plain of Thessaly, each separated from its neighbour by mountain ranges. Fig. 152 shows the hill of the Acropolis, the heart of Athens, the great city state of Ancient Greece. In the centre can be seen the ruins of the Parthenon. In the background is part of modern Athens, chosen to be the capital of Greece when the country was freed from Turkish domination in 1830. With its suburbs and the port of Piraeus, it now has a population of $1\frac{1}{2}$ million.

Fig. 153 shows part of the port, the centre of a network of sea communications with the Greek islands which form about a quarter of the total land area of Greece. They are the tops of submerged mountain ranges. A canal through the Isthmus of Corinth was cut to link the western islands with Piraeus avoiding the long voyage round the Peloponnese, the southern peninsula of Greece.

55. (*a*) How long does it take to travel by train from Skoplje to (i) Thessaloniki; (ii) Athens?
    (*b*) Find the height of Mount Olympus.
    (*c*) What was its importance in Greek mythology?
    (*d*) Find the following in your atlas and say what was their importance in Greek history: (i) The Pass of Thermopylae; (ii) The Plain of Marathon.
56. (*a*) The largest Greek island, Crete, is part of a folded mountain range which once linked Greece and Turkey. (i) What is its maximum height? (ii) What other islands are part of this range?
    (*b*) What is the distance by sea from Piraeus to (i) Siros ('The Clapham Junction of the Greek Islands'), (ii) Rhodes, (iii) Candia (Crete), (iv) Corfu (via the Corinth Canal), (v) Thessaloniki?
    (*c*) Describe the 'frontier' between Greece and Turkey.
57. (*a*) Draw a sketch of the Piraeus from Fig. 153 showing the position of (i) the main quays and (ii) the railway station.
    (*b*) Describe the layout of the town in the foreground.

It was in this environment of mountain plain and sea that Greek civilisation developed over 500 years before Christ. In

FIG. 153. THE PIRAEUS.

numerous city states on both the mainland and the island, men had leisure to discuss problems in the open market-place and to develop literature, drama, music and art to a perfection never known before. Strife between neighbouring states led to the downfall of this civilisation and domination by foreigners until modern times.

Modern Greece is a poor country with a population of 8 million, over half of whom earn a living in agriculture. An example of a typical small area of Greece was considered in Chapter I. One reason for the poverty of many parts of Greece is soil erosion (page 156). However, malaria control and land reclamation schemes make improved agriculture possible.

There is little surplus of agricultural produce for export except the currants from the western parts of the country which are collected for export at Patras and tobacco exported from Thessaloniki and Kavalla in the north. Tobacco, which is grown in the

river valleys and coastal plains, accounts for about 40 per cent. of the export trade of Greece. The acreage of tobacco, sugar-beet and even rice is expanding especially in areas of reclaimed land.

In the past the chief industries have been food processing (flour, oil, canning) and tobacco processing and the production of textiles, metals and chemicals for the home market. Only 16 per cent. of the population is engaged in industry, which has hitherto been dependent on foreign coal and oil for power. Several hydro-electric power stations have been constructed, the chief being in connection with the River Akheloos in the Pindus mountains of western Greece. Local deposits of lignite are used to generate electricity in Macedonia. There are large modern oil refineries at Thessaloniki and Piraeus and petro-chemical industries have developed. Shipbuilding, iron and steel, mechanical and electrical engineering industries are developing and textiles now use synthetic fibres in addition to cotton, wool and silk. There are small amounts of mineral ores in the mountains, bauxite and chrome being the most important. Inaccessibility and lack of capital have delayed their exploitation.

58. (*a*) The area of Greece is similar to that of England and Wales. Compare its population with that of (i) England and Wales; (ii) London.
(*b*) Suggest why modern Greece is so thinly peopled.
(*c*) What proportion of the population lives in the two great urban areas of Athens and Thessaloniki?

59. (*a*) Draw two bar graphs to illustrate the following trade figures

In millions of drachmas.

Imports		*Exports*	
Machinery and Transport Equipment	13,500	Food	4,000
Manufactures	7,000	Beverages and Tobacco	3,500
Foodstuffs	5,000	Raw Materials	2,000
Raw Materials	4,000	Manufactures	1,500
Chemicals	3,500	Others	1,000
Mineral Fuels	3,000		
Others	1,000		
	37,000		12,000

(*b*) Give a brief explanation of the exports.
(*c*) How great is the trade gap?
(*d*) What activity helps to bridge this gap? (Chapter I.)

Greece is a commercial rather than an agricultural or industrial country and the Greeks are sometimes described as 'sea pedlars' carrying cargoes over a wide area of the Mediterranean and even beyond. As in Norway, earnings from shipping make a considerable contribution to the national income, helping to close the trade gap. Communities of Greek traders are found in many parts of the world, for emigration is a feature of Greek life as in other Mediterranean lands.

Albania

On the west coast of the Balkan peninsula between Greece and Yugoslavia lies the small country of Albania with a population of only $1\frac{1}{2}$ million. It has a Communist government but it is cut off from the main block of COMENCON countries (Chapter II). It is a country of lofty folded mountains which link the Dinaric Alps with the Pindus mountains of Greece. Only one-third is lowland but much of this is ill-drained. Most of the people live in the foothill country where there are gentle slopes and Mediterranean agriculture can be practised. Olives, figs, apricots and peaches are more important than the vine as Albania was a Moslem country. Wheat and maize are the chief cereals. In the mountains forestry and stock rearing are the chief occupation. There is a little mineral wealth, coal, copper, iron ore and chrome now being developed. There is no town with a population over 100,000. Durazzo the chief port is now linked by rail to Tirana, the capital.

60. (*a*) Which is the nearest COMENCON country to Albania?
    (*b*) How far away is it?
    (*c*) What country lies between?
61. (*a*) Explain why the lowlands are ill-drained.
    (*b*) What crops can be grown when the lowlands are drained?
    (*c*) (i) Draw a diagram to illustrate the land use of Albania: 40 per cent. forest, 30 per cent. pasture, 12 per cent. arable, 18 per cent. waste land (rock, swamp, etc.). (ii) In which part of the country is each type found?

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BOOK IV MAP 2 SWISS NATION

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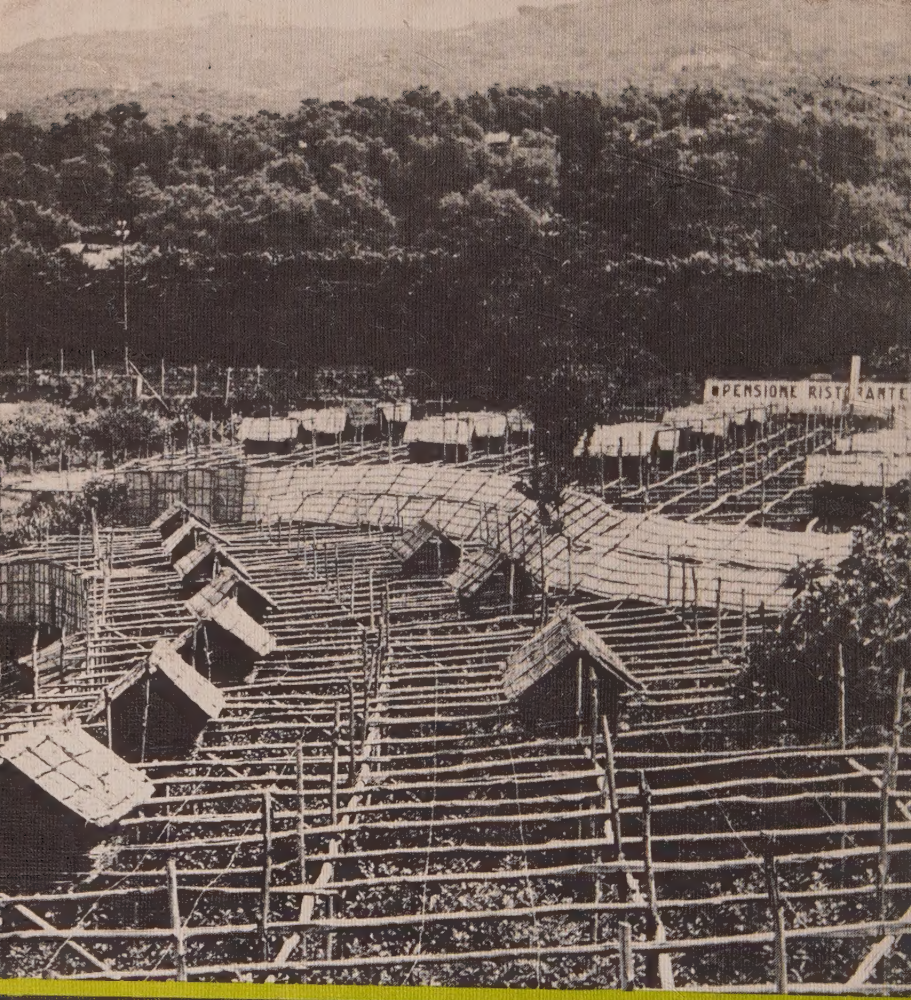
Survey of Switzerland, Wabern–Berne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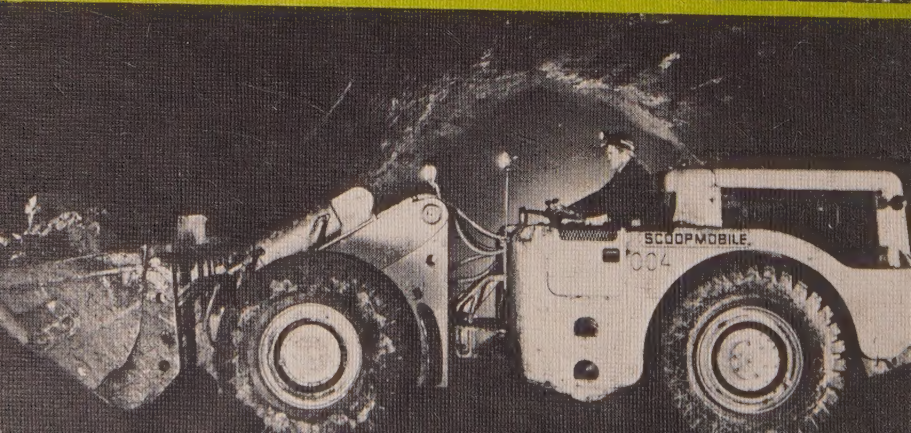
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